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survey

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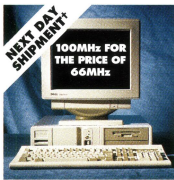
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Australian Personal Computer, April, 1994.

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PC Review, December, 1993.

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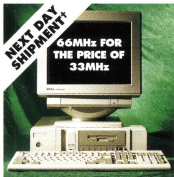
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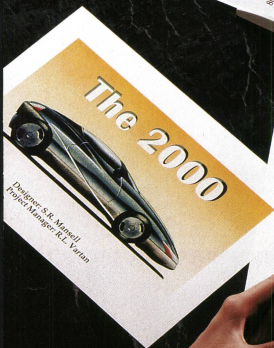
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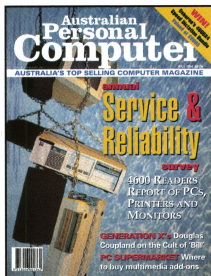
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Canon

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Service and Reliability Survey



We're loved and hated for it. Results from APC's Service and Reliability Survey have a propensity to be quoted in lawsuits, threatening letters, reader praise and ads alike. It's the only major survey of what Australians think of the computer equipment they buy and use on ongoing terms. How well it meets their expectations. How reliable the quality of service and support.

Each month we benchmark, analyse and review dozens of products. While our benchmarking and spec-ing are exhaustive, we can't hope to analyse how well a PC or peripheral will hold up over time, or how strongly a company will support its product.

We're always evaluating the new or exciting. Our desks are cluttered with cutting edges. And the product life cycle for an evaluation is not measured in months and years, but days and weeks. Three months old is old hat; a year is a millennium.

The danger of this constant cycle of new products is that it can isolate us, as reviewers and analysts, from the realities of purchasing and using technology. Sure, our own equipment grows old as quickly as anyone else's, but we don't often have call to write about last year's PCs.

The Service and Reliability survey is our annual catharsis, where we're plucked from the threat of a complacent fairy land and reminded with a bump that product lives are measured in years, and that the investment readers make has to provide a reliable return for them not just this year and next, but the year after the year after that. It is sobriety-inspiring to digest a reader's ongoing 18 month nightmare with a product that you looked at for three weeks and thought was the best thing since SCSI-II. It is a healthy experience.

We often get complaints from vendors about our survey — and a few have dropped advertising in response to it. But readers certainly don't complain, and there are as many or more companies that have heeded negative results and worked hard to improve their performance, rather than carping about statistical methods or unfair treatment.

As Geoff Isaac notes in his introduction, we don't write the responses, our readers do.

Geoff and his team have collated 4672 reader responses to the questionnaire we published with our February issue. We hope you find the results as interesting as we have.

Also in this issue, we take a snigger along with Douglas Coupland at what might be termed the culture of the ancient geeks, with his story: 'Microserfs: Seven days in the life of young Microsoft'.

New ground breaking PowerBooks from Apple, the first of the mainstream SX2/50 and DX4/100 PCs from Dell, and the latest monolith of all things graphical, CorelDRAW 5.0, round out our coverage.

A stylized, handwritten signature in dark ink, likely belonging to Maryanne Phillips.

Maryanne Phillips
Editor

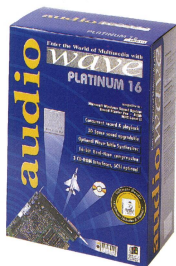
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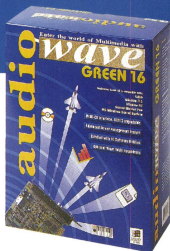
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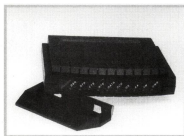
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Stolen Silicon — the next major crime wave?

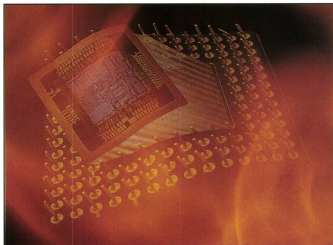
Stolen microprocessors could well represent the new money spinner for heist and sell-off merchants, according to *Time* Magazine. The May 2 issue reported that the problem has reached epidemic proportions in Silicon Valley, where the loss in theft of stolen silicon is estimated to be \$US40 million in the last year.

A special task force has been established to track and clamp down on computer related crimes. The 12-person group has recorded a dramatic increase in the number of violent computer related raids, usually on smaller operations, and characteristically by gangs with easy access to brokers.

Shortage of supply and strong fluctuations in demand have created a ready 'grey' market for microprocessors, according to several Australian assemblers, many of whom regularly go offshore to source components to fill rush orders.

While none of the people APC contacted was willing to be quoted, the consensus among those who regularly source chips is that to buy stolen goods deliberately or unsuspectingly is "as easy as can be".

And with a value per weight greater than that of either gold or cocaine, it is easy to see the attraction in stolen silicon. Mark Kerby, from the Santa Clara police force, told *Time*: "Computer components are



fast becoming the dope of the 90s because they are so easy to get rid of."

David Hill from Motorola Semiconductor in Melbourne agrees that the threat is significant, although he sees the risk in Australia to be much lower than in the US. "We haven't had any problems of that nature here in Australia, although we have had parts of shipments go missing on the way out here."

Also, he says, the threat is less pressing for Motorola than for example, Intel, as Motorola chips arrive soldered to boards, whereas Intel chips are packaged loose, plugging in rather than being soldered on.

Less easy to get rid of, but as indicative of the trend, is a shipment of Samsung notebook computers which disappeared from a cargo dock

at Sydney Airport over Easter. The shipment, comprising 50 high-end 486/25 notebooks with TFT colour screens had an estimated market value of \$100,000. Personnel director at Samsung, John Richardson, is convinced that it was a haul for technology's sake, rather than a random heist. The thing to remember is that the shipment was under customs control, in a bonded area. That means that security was higher than usual. For it to have been worth the considerable risk, whoever is responsible must have had a fair idea of the value of the goods and how to get rid of them."

Anyone who has been offered a bargain Samsung notebook by private sale can help by contacting Mascot police on (02) 316 6955.

Helen Dancer

PA/x86 chip due by 1998

Chip maker Intel and systems vendor Hewlett-Packard (HP) have announced plans to produce new CPUs compatible with both their existing microprocessor architectures.

Compatible with today's x86 processors from Intel, the new processors, due in 1997 or 1998, are to be based on a Very Long Instruction Word (VLIW) architecture.

The chips would also be binary compatible with software written for PA/RISC-based systems from HP. Using VLIW technology, where the CPU processes large instructions made up of

multiple 32 or 64-bit instructions, Intel and HP plan to deliver over 10 times the performance of today's Pentium processors.

Like IBM, Apple and Motorola's PowerPC chips, the Intel/HP chips will power computers from handhelds to mainframes, claim officials.

The new processors are independent from Intel's P6 family, due late next year, but have sent engineers back to the drawing board for the P7, already under development.

Chris Bowes

News summary

Things are looking up for the computer industry, especially after the recent IDC briefing indicated that healthy growth would continue for the next few years. However in some areas we are still seeing the death throes of companies fatally mauled by their inability to handle the economic downturn of the last four years.

Amstrad has pulled out of the PC business in Australia altogether. This is a sad turn of events for a company that only four years ago was one of the top 10 suppliers in Australia.

If you have a long memory you may recall one of the last major Amstrad advertisement campaigns. This featured an ugly scene of an elephant's graveyard. Now Amstrad is just one of the departed.

Another company that once loomed large was Commodore. It was best known for its excellent Amigas, but it also shipped many PCs into the retail channel. Commodore is in the hands of a liquidator and its creditors are expecting only cents in the dollar back. (For more details on these two companies, see our Service and Reliability cover story.)

Atari was once the rising star in the games market. Now the local branch owes its parent \$8 million and the liquidators are searching for money to pay.

If these failures aren't enough to convince you that the retail end of the computer business is very tough, then take a look at Brash's. One of the first retailers to get into selling computers, Brash's last month called in the receiver.

In other areas the price wars continue. Microsoft sharply upped the ante in the suite wars by adding two new pieces of software to its Office suite and simultaneously cutting the price. Now for \$875 you get Word for Windows, Excel, PowerPoint, Access, the Microsoft Mail client, Publisher and Money.

This is six applications for \$875 or less than \$150 each. Now, of course, not everybody wants all the applications and they are not all of the same value. In fact, it is a rather strange mix of applications. Money is a personal finance manager while the Mail client is a corporate application. But whatever you look at it, it is cutting the cost of software.

Lotus has not so far matched the Microsoft price. However, Lotus has been selling five applications for \$900

Apple introduces
the latest technology
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Today, Microsoft makes some of the most popular software for people who use Macintosh personal computers.

So at Apple, we thought it was time to return the favour by making some of the best new hardware for people who use MS-DOS and Windows.

Like the revolutionary Power Macintosh. What makes this computer so revolutionary is its microprocessor, which was developed jointly by IBM, Motorola and Apple.



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This microprocessor makes use of Reduced Instruction Set Computing (RISC) chip architecture often found in high-performance workstations.

This advance makes it possible for quantum leaps in performance, giving you the power needed to take advantage of evolving technologies like voice recognition, video conferencing and multimedia.

More pleasing still is the fact that Power Macintosh is compatible with Windows and DOS applications, using SoftWindows™ software.

That's not to say other Macintosh computers can't read your Windows and DOS files. They can, running a program called Macintosh PC Exchange.

Networking has always been easy with Macintosh, you simply plug and play. Now, along with built-in Ethernet, you can connect to popular network standards such as Microsoft, IBM's SNA, Novell's IPX, Digital's DECnet, as

well as the most popular standard in the UNIX world, TCP/IP.

Of course, as you've no doubt gathered from the photo, Macintosh isn't the only Apple product that fits into the DOS and Windows world.

There's the Newton MessagePad, the personal digital assistant from Apple. With the Newton Connection Kit, you can share information with PCs running DOS and Windows, as well as update, transfer and synchronise that data.

There's new Apple QuickTime software for Windows, which gives you a cross-platform standard for including sound, video and animation in virtually any document you're working on.

Plus there's a variety of other Apple peripherals – the Apple OneScanner, the QuickTake Digital Camera, Displays, the LaserWriter Pro 630 plus the Apple CD and speakers – that fit in with equal ease.

But what is most impressive is that all of this can only be described as the beginning.

Just as we did ten short years ago, Apple is once again poised to transform the personal computer industry, only this time we'll be taking users of DOS and Windows along with us.

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News summary

in its SmartSuite. These applications are rather better matched than the Microsoft set and Lotus is promising a major upgrade in the second half of this year.

In the modem arena, price cuts have been coming thick and fast, as we reported last month in this section (see June, 1994 APC, page 22).

On the printer front, Lexmark cut prices and produced enhanced versions of its printers that are built in Australia. Xerox joined the ranks of those claiming substantial local content with a controller board designed and manufactured here in Australia. The board is added to printers from Japan, giving Xerox a range of medium speed lasers to complement its high end range.

There was another big takeover this month as Computer Associates (CA) gobbled up the Ask group. A couple of years ago Ask, a maker of vertical applications, took over Ingres, the company that made the database it used in its applications. Now, after several years in the doldrums, Ask has passed over to CA, cementing its position as the largest software maker after Microsoft.

CA already has two mainframe database products and the PC-based dBASE compatible products Clipper and dBase. Ingres gives it a firm position in the client/server database market.

Jeremy Horey

Intel and Apple: Visionary-compatible

Intel will retain binary compatibility with its existing processors as it moves past Pentium to P6 and P7 generations, according to David House, Intel's senior vice-president. The company's operations are also increasingly focussed on the future of the PC as a mass market information appliance, with the development of partner technologies to its core processor business, such as Indeo Video, Plug and Play, and PCI. These aim to combine faster processor performance with the high bandwidth communications and throughput required for real-world data forms like sound and video, and the ease of use necessary for consumer products.

Two weeks before House's Sydney visit, Apple's CEO Michael Spindler said that Macintosh users were facing software upgrades and incompatibility with the move from Motorola's 680X0 line to the RISC-based PowerPC. He ar-



Intel's Pentium processor design team. According to company vice-president David House, "the P6 will be shipping in 1995 and Intel already has several dozen engineers working on the P7. The P7 continues the line of doubling performance every 18 months. It will be 100 per cent binary compatible."

gued, however, that Intel-based PC users would face the same issues at a point within the next few years, probably with the move to P7, as Intel reached an "architecture

breakpoint", and also moved to RISC.

Referring to the breakpoint, Spindler said that "all the crap we get now will be big time for Intel when you get out here."

Intel's House responded by outlining the company's release schedule for new processors, arguing that while the 386 had been a 32-bit CISC chip, the 486 had combined CISC and RISC attributes, and that the Pentium was a Superscalar RISC processor, which offered binary compatibility on the chip with previous releases. Intel's next Pentium release would be the 815/100, which would 0.6microns, running at 3.3V with 6 watts power dissipation, and offer a 50 per cent performance improvement over the 66MHz Pentium.

Despite their disagreements over future compatibility issues, both Spindler and House offered similar visions for the continuing growth of personal computing.

The Queensland export

Queensland-born information technology and telecommunications projects are finding a booming market in Asia, particularly in Indonesia, thanks to assistance from the Queensland Information Industry Board's export centre.

It is part of a scheme set up under the state government's IT strategy to make the most of its prolific IT output and high number of top-calibre science and technology graduates.

It is a little known fact, according to the export centre's driving force, David Henderson, that over two thirds of all IT doctorates in Australia emanate from Queensland institutions, and that there are one and a half technology graduates to every one in the rest of the country. It was either a question of addressing the best use of the graduates' talents or seeing them perpetuate a gradual brain drain from Queensland to other states or to a waiting market overseas.

The scheme, which was allocated \$6 million over a three-year period, has a charter of developing a 10-year IT strategy with both a local and export focus. "It is well established that if we can use technology to make better use of information in traditional industries, there is a multiplier effect," Mr Henderson said. Additionally, IT-based industries have a high knowledge-based com-

ponent and represent significant value adding opportunities. Part of the scheme's methodology, and certainly one of its most successful outcomes, is the expansion into export ventures, by many small Queensland IT companies which would not otherwise have dared such a mammoth undertaking on their own.

An undisputed beneficiary of the scheme is Cairns-based software designer Crater Software, which supplies customs and trading software to the Indonesian government. Before the export program, Crater was a one-person business providing custom made software on individual contracts. Today the company employs 25 people, and exports the majority of its technology and expertise into Asia.

There is huge demand for Australian expertise in Asian markets, according to Mr Henderson. Indonesia represents one of our most important potential markets, he says, both in immediate terms and over time. It is also Australia's closest neighbour, and its cities are geographically closer to centres such as Cairns than other Australian capitals such as Sydney or Melbourne.

Queensland IT firms wanting more information about the export program should contact the board on (07) 405 5111.

Helen Dancer



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Windows 3.1 performance tests performed by Diamond Computer Systems, Inc. using Ziff Davis' WinBench Versions 3.11 and 4.0 on an Intel Pentium-66 PCI system with 256K cache, 16MB RAM, 240MB IDE hard drive, SmartDrive 2048, and DOS 6.0. The Stealth 64 was configured with 2MB VRAM at 1024x768x256 colors 70Hz large font using driver release 1.00b. All trade names referenced are the service mark, trademark, or registered trademarks of the respective manufacturers. Diamond reserves the right to change specifications without notice. Copyright © 1994 Diamond Computer Systems, Inc.

Spindler said that Apple's platform represented 14 per cent of the market. The company was aiming for 25 per cent, but this required more than one vendor. "Who we license the operating system to, not the hardware, is the question." IBM's problem, according to Spindler, had been that "most of the clone guys are just fillers. They don't create markets."

Intel has grown in the last 10 years from 10 per cent of the PC market to 90 per cent. At the same time, the installed base of PCs has grown from 17 million to 125 million.

Spindler said Apple was relying on a collaborative future for computing, and was working with developers to ensure its eWorld service was highly localised. "If you look at online services, most compete with each other, not with MTV or the local bookstore. With eWorld, it's the creative community you need to get online."

"There will be a home net," argues Spindler. "TVs don't handle text well. PCs

handle text, but can also play movies."

Referring to Robert Cringley's rule that it takes 30 years for a new technology to become fully absorbed by society, House said that PCs were still a decade from fully penetrating every household as a daily part of life.

"By the time the Sydney 2000 rolls around and the Olympics are happening, you can see a completely different computing environment. There are two things; one, more natural information and interfaces for users, two, while parents were used to books and text, children are used to video/audio, and they won't tolerate text-based systems."

House argued that six months ago, discussion of the Information Highway was in 'revolution mode', and now it was in 'evolution mode'.

"PCs this year are playing a very large role. Last year, they played a very small role. There's no doubt they will be the information appliance."

Jeremy White

Looking smart!

Sun Microsystems has entered the mobile workstation market with a machine that addresses some of the most talked-about concerns of the 90s.

Sensitive to environmental impact, ergonomics, and shrinking office space, Sun's SPARCStation Voyager also incorporates some of the latest technological trends, such as infrared and PCMCIA technologies. The Energy Star-compliant Voyager's ergonomically-correct monitor consists of a tilting flicker-free active matrix flat screen. A detachable keyboard does not force users' hands into an uncomfortable position and the absence of a fan makes the machine virtually silent.

Housing a 60MHz microSPARC II CPU, the Voyager is also equipped with 16-bit audio, 16M of memory, a 340M hard drive, I/O interfaces, and twisted pair Ethernet, ISDN, SCSI-2, parallel and serial ports. Prices start at around \$21,000.

Despite its portability, Sun sees the 5.8kg Voyager — which is meant to fit into the tightest of workspaces — as quite different from PC notebooks on the market. "These are not systems that sit

by themselves on people's coffee tables," said Sun spokesman Greg Muster. "They are integrated into a larger information enterprise, which Voyager users can access via the system's TCP/IP suite."

It is this connectivity to enterprise networks that makes the Voyager fit into Sun's overall corporate strategy.

"Sun is interested in volume opportunities rather than niche markets," said Muster.

"Overall it is Sun's mission to deliver these enterprise systems."

For more details contact Sun Microsystems on (02) 844 5000 or fax (02) 418 2023.

Brian Riggs



SYSTEMS

DX4 is ready and shipping

According to NEC, availability is one of the characteristics of its new DX4 notebook that distinguishes it from competitors. Although as we go to press there have been announcements of DX4 notebooks from other vendors, our own investigations have established that actual shipping products remain rare.

NEC Australia's Isaku Sato says that differentiators are important for NEC in a marketplace where its competitors grab market share by dealing to "all of the people all of the time". Broadband offerings obscure the real picture, according to Sato, who asserts that despite NEC's consistent fifth ranking in Australia, its notebooks, in their own category, have no peer.



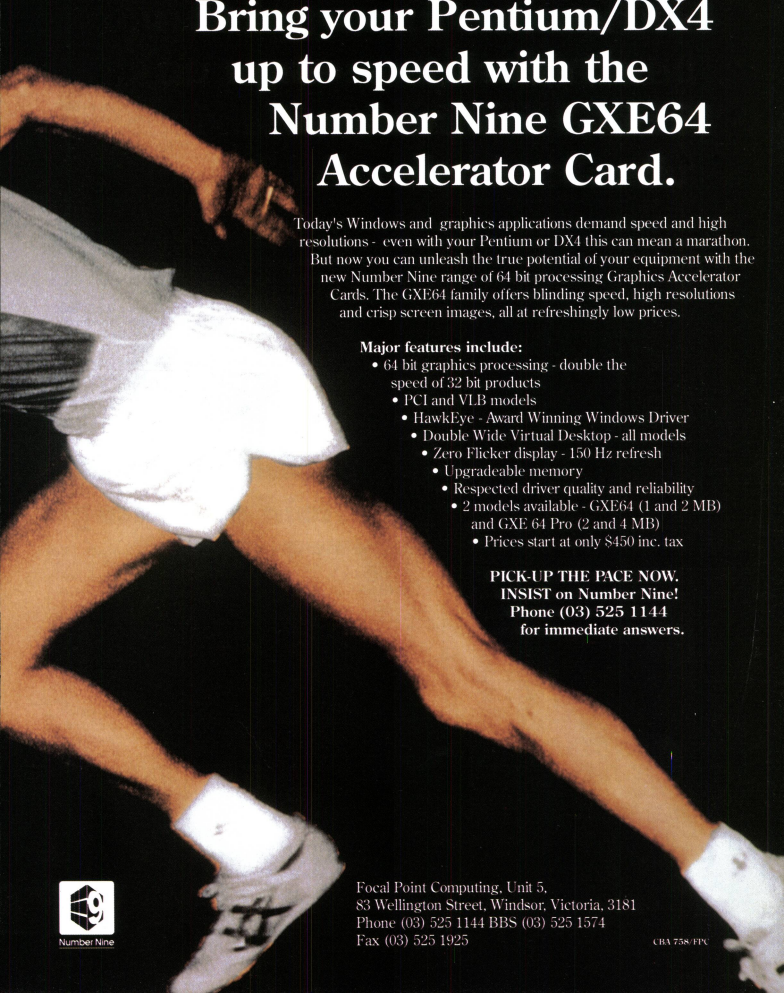
"The discussion revolves around the issue of volume, which is misleading in terms of the products. In the US, NEC is involved in niche marketing — a particular configuration of notebook for a specific pur-

pose. And it is important to remember that in some of these niche areas we do not have to compete for that specific customer because there is nothing else for them." Mr Sato cites flip screen technologies and high

resolution notebooks as niche market categories in which his company's machines are without significant competitors.

In Australia, however, NEC competes in a generalist rather than niche way, because the size of the market dictates that niche marketing will not return adequate reward for effort. Thus, NEC's few models go head to head with the many models from both Compaq and Toshiba. "When they have more models, it is not surprising that they look as if they are more popular. What we are saying is that in those configurations in which we compete, NEC performs very, very well against those vendors," Mr Sato said.

Helen Dancer and Stuart Bowman



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Video on demand application to be based on PC

Intel and Microsoft have banded together to develop a PC-based architecture that may provide video on demand services to nearly any number of users.

Based on Intel's scalable multiserver technology, the architecture is grounded on Microsoft's Windows NT operating system as well as its new Continuous Media Server Architecture — also known under the code name 'Tiger'.

The Intel technology is now used in a number of parallel processing supercomputers. Intel recently demonstrated a system running 16 Pentium processors, delivering in excess of 3000 simultaneous

video streams. According to Intel representatives, such a system could be expanded to literally thousands of parallel processors.

Working together, the Pentium-based multiserver technology and Tiger file system are being designed to provide video on demand to customers ranging from small businesses to metropolitans.

"In a hotel, you may only need to supply a hundred different streams of video," commented Intel's Howard High, describing how the jointly-developed system would be used. "[That service] may run on a single, compact Pentium PC."

Brian Riggs
Editech International

Cyrix makes new chip

Chip developer Cyrix Corporation, in the midst of ending its relationship with Texas Instruments and starting a new one with IBM, announced its intention to begin shipping late last month its new 486DX2 processors for notebook and desktop computers.

The new 3-volt chip is "the first fruit of our new relationship with IBM," said Steve Domenik, Cyrix marketing vice-president. In April of this year, Cyrix and IBM announced a five-year agreement in which IBM will become a primary manufacturer of Cyrix-designed 486 microprocessors. Cyrix will have access to IBM's half-micron CMOS process technology for use in its Pentium-class processors.

IBM replaces Texas Instruments, which used to manufacture chips for Cyrix. Cyrix terminated the 1991 manufacturing/supply agreement with TI in July of last year claiming TI reneged on its obligation to supply wafers and legal indemnity.

TI has filed a lawsuit against Cyrix,

because Cyrix did not transfer the technology of its original 486 chip and follow on, said Buddy Price, TI spokesperson. Cyrix has responded with a countersuit for \$US750 million.

"As a result of TI's refusal to honour its production and allocation commitments," said Russ Fairbanks, general counsel for Cyrix, "Cyrix lost hundreds of millions in additional profits that would have been generated by the unfilled demand for its high performance math coprocessors and microprocessors."

Although Cyrix has teamed up with IBM, US In Stat analyst Morry Marshall said Cyrix is in a "difficult position... Intel dominates the market, and Cyrix chips seem to only follow Intel's lead, so Cyrix gets a smaller market share." Despite the competition, Cyrix "seems to be holding its own," said Marshall.

Monica Snell in Silicon Valley
Editech International

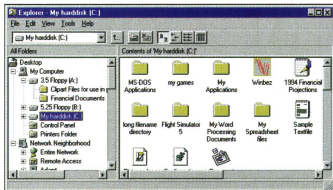
SOFTWARE

Bill Gates lifts the curtain on Chicago

The world had its first look at Windows 4.0 (Chicago) on Monday May 23 when Bill Gates, Microsoft Corp chairman, placed Chicago and several other significant projects on centre stage during his Windows World keynote address.

"Great to see you've got all that running," Gates said in jest to an assistant after running a demo of Chicago. Users will only need to click on a 'Startup' icon in the bottom left corner of the screen to do 90 per cent of what they will need to do, Gates said as he demonstrated how 'Startup' will give users a listing of Programs, Documents, Setting, Find, Help and Run functions.

Also, Gates demonstrated a utility called Explorer that replaces the current Windows File Manager and Program Manager. By highlighting a directory in a listing on the left



Windows 4.0 (Chicago) integrates help files of all running applications

side of the screen, it causes icons for any program in it to appear on the right side of the screen.

Chicago will also allow users to modify the screen resolution without having to leave Windows, which is not currently possible. Gates also showed how the system help screen integrates help files of all running applications.

"Chicago will create an immense number of opportunities for all industry participants," said Gates. "For the first time for a new operating system, all popular applications will be moved across to it within 90 days of its release. We have really charged up the industry and they are committing to building these applications."

Gates also addressed the Plug and Play functionality of Chicago, by which new boards can be added without reconfiguration. "In most cases, the hardware to enable Chicago will be ready before Chicago comes to market," he said.

Chicago will go into its first beta test within a month, and a second beta run in the third quarter, with shipment in the fourth quarter, Gates said.

When speaking of the information superhighway, Gates referred to himself as a zealot, and demonstrated another project, codenamed Tiger, which is meant to handle the problem of establishing 'continuous media' across networks, to allow remote access to audio and video material using servers running Windows NT.

"This will not happen overnight," Gates said of audiovisual access through networks, but the necessary

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Cheyenne FirstServe Software - single server NLM backup for Netware offering full or incremental backups of all files on the server. Easy to use Windows based software with Intelligent restore and automated tape management at an economical price.

Xpress SERVE Software and Enterprise Wide - Server Based Network Backup - These two packages provide high speed, easy to use, file server based backup solution for Netware 3.1X and 4.X. They feature multiple server backup, scheduled and unattended operation for backup of Novell and workstations. The Enterprise NLM backs up directory services and is fully SMS compliant to ensure compatibility with future releases of Netware.

Xpress Librarian Software Fully Automated - runs in an easy to use Windows environment including Windows for Workgroups. The package allows for backup of Netware 4.X, 3.X and 2.X servers and local hard disks (with peer-peer add-on module). Xpress Librarian offers both full and incremental backups in unattended mode, as well as disk grooming with file usage and aging reports.



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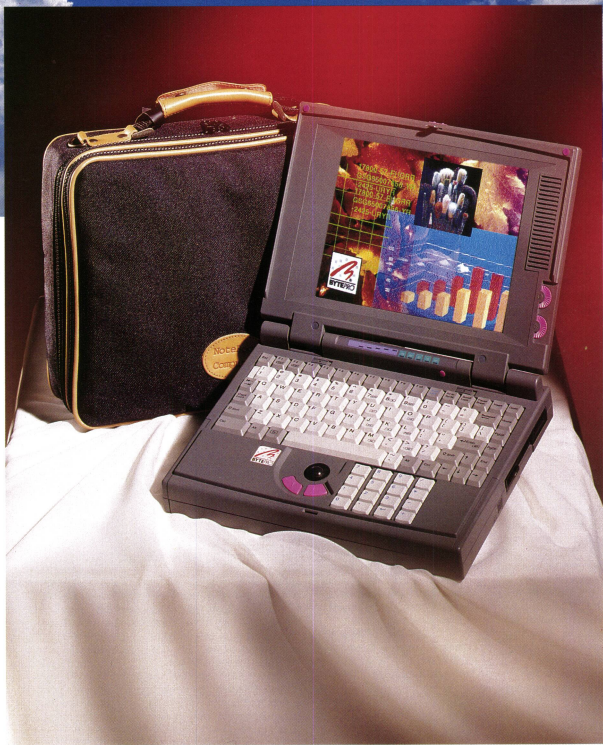
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'boot strapping' is happening now through CD-ROM experimentation in the market. "We can take all that work on CD-ROMs, put it on a Tiger server and immediately have a virtual bookshelf," Gates said.

Gates showed a demo of Daytona, the next release of Windows NT, running 32-bit applications. A bicycle was designed onscreen by choosing components from an Excel database, and a CAD file revolving until it spun — using a dual-Pentium machine with 32M of RAM and a graphics accelerator, Gates noted.

Windows developers were repeatedly assured by Gates, as he said that Windows sells approximately two million copies a month, and that PC sales are US\$40 million per year with the amount increasing by 15 per cent each year.

Ann Steffora in Atlanta, Edittech International

CAST market to grow into maturity with advanced tools

Computer Aided Software Testing (CAST) products are starting to be recognised by developers as an important new market.

As software becomes more complex and valuable to a business' success, there is a growing need for a new generation of software products which can automatically test programs.

CAST tools are created by designing testing infrastructure or methodology to analyse a software program's various errors.

Instead of manually going through the testing procedure, CAST tools are used to automate the drudgery of interfacing with the program and recording all results. This saves testing time and of course decreases the drudgery of performing boring tasks. It also minimises human testing mistakes and produces a much more accurate record of where errors in a program code might be.

Supplier revenues from CAST tools increased by over 35 per cent last year, but the market is still considered 'immature' said Dr Stephen Norman, an analyst for market research firm Ovum, based in the UK.

There are two types of CAST tools. 'Dynamic' tools simulate input into the system and checks to make sure that the output is correct. 'Static' tools, however, look at the code itself while the

program is running and provide the developers with a record of where errors were found. Both of these types of tools are now becoming more popular in the software development world.

The growth of CAST is due mainly to its saving developers money, he said. Testing can take as much as 30 to 50 per cent of a software department's staff budget so tools which help to lower this cost while also saving time can show a dramatic savings. The dynamic testing tools sector was worth US\$100 million dollars last year while the static testing tools were worth US\$15 to US\$20 million.

In a recent study, Dr Norman evaluated 26 leading testing tools ranging from products to test software for the PCs to the mainframe. From ATF, a testing program from Sofbridge, to XRunner and WinRunner from Mercury Interactive, the products were given extensive appraisal. For example, the 'Microsoft Test' product from Microsoft was ranked high by Dr Norman in value for money, and he described it as having an "awesome rich and powerful environment". However, he said that Microsoft's product needs further work for the automatic generation of a standard logfile with easy review of test case results.

Martin Cheek in London

Art right now, on CD

More than 400 paintings from 45 of Australia's "brightest and most innovative" artists have been included on the CD-ROM collection, *Art Right Now*. Compiled by Martin Shub and Helen Bongiorno, the CD-ROM format has been used to allow a large number of full-screen colour images to be accessed at a single time.

The project came about through a chain of events. In 1992 Martin, who had worked in visual arts, graphic arts and desktop publishing, and Helen, previously Editorial Manager for Art and Australia magazine and several arts programs, formed Discovery Media. The same year they released AVID (Australian Visual Arts Databases, enjoying its third version this August). "People said, 'Okay, but where are the pictures,'" recalls Martin.

The pictures are in *Art Right Now*.

Paintings can be viewed from a number of thematic angles; aboriginal art, abstract art, feminist art or figurative art. Alternatively the viewer can choose to select an artist by name, bringing up their history and details. Paintings can be enlarged to full-screen size, and each comes with a commentary from authors such as Vivien Johnson of Macquarie University and Brisbane gallery director James Baker.

"*Art Right Now* is designed specifically for schools and tertiary institutions," said Martin, "Essentially it was to ensure that art teachers and students remain aware of what's happening with artists who are doing interesting things, some of whom may not be well known."

The *Art Right Now* CD-ROM costs \$295. The company can be contacted on (02) 369 4314.

Nathaniel Tunbridge



The *Art Right Now* CD has details of each painting featured, including the artist's history. Picture courtesy Terry Batt and Discovery Media

PERIPHERALS

Audio files setting higher standards for sound boards

When it comes to PC audio, the term 'Sound Blaster compatible' is a nebulous phrase that glues your PC's sound-making capability to the lowest common denominator. In 1988, Creative Labs set the Sound Blaster standard of 8-bit monaural audio that games still use today. With the emergence of hardware that provides CD-quality 16-bit sound, the audio board business has been searching for a new standard. And the call has grown louder with the recent filing of some nasty lawsuits over Sound Blaster compatibility.

Out of the cacophony, the industry is hearing the trumpet-call for standards. VESA (the Video Electronics Standards Association), which cut its teeth establishing standards in graphics boards, has created the VESA BIOS extension-

/Audio Interface (VBE/AI) and has opened it to all vendors who make audio hardware products such as chips and sound boards as well as to game and multimedia software vendors. VBE/AI has application programming interfaces (APIs) for both digital audio (.WAV) and MIDI files. Already, two audio chip set manufacturers in the US, Media Vision and Sierra Semiconductor, have endorsed VBE/AI. The Media Vision Premium 3D sound card is the first to use the standard.

Some vendors argue that VBE/AI may not be the answer. Bob Starr, vice president of marketing at Yamaha in the US, says, "VBE/AI is too little, too late. We already have a standard for general MIDI." And since the primary architect of the spec was Media Vision, Starr feels Media Vision has too much of a vested interest in

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VBE/BI. Another shortcoming: VBE/BI has no provision for 32-bit protected-mode operation under DOS, although VESA promises an update.

Creative Labs intends to promote the Sound Blaster 16-bit specification as the follow-up to its 8-bit de facto standard. "The strongest way to insure the quality of audio is as an extension of [8-bit] Sound Blaster compatibility," said Arnold Waldstein, director of software product marketing at Creative Labs. Sound Blaster compatibility will be free to software developers, but Creative Labs will license its 16-bit spec for a fee to hardware manufacturers. VESA's spec is free.

Christopher Barr

Optical disks go into overdrive

Pinnacle Micro, a small company that championed magneto-optical technology as an alternative to traditional magnetic hard disks, is at it again. This time Pinnacle, based in Irvine, California, has developed a 5.25 optical storage system that it claims is as fast as a hard disk.

Magneto-optical (MO) technology has certain advantages over traditional magnetic hard disks: one MO disk can store about 1.3G of data, it's removable and portable, and it lasts over 20 years. These features make MO disks ideal for archival storage. When compared with ordinary hard disks though, MO drives have always had slower disk access times and longer disk write times. These dis-

advantages made them less attractive than ordinary hard disks.

Pinnacle claims its Oray architecture overcomes many of the disadvantages of older MO technology. The Oray optical disk system consists of four removable 1.3G MO disks in a single case with a SCSI-2 interface. Using a new controller design that's driven by a powerful RISC processor, Pinnacle's Oray can write to or read from two or four disks simultaneously at hard disk transfer rates. It uses up to 64M of cache memory to assemble the data before writing simultaneously to all the disks. While the Oray system sounds like a RAID 0 setup, which does disk striping over multiple hard disks, Pinnacle is

quick to say that Oray is unique because of its controller technology. An application-specific integrated circuit on the controller supports parallel processing; unlike a magnetic disk drive, circuitry for the analog-to-digital conversion is dedicated to each individual surface.

At \$US14,995, the Oray magneto-optical disk system doesn't come cheap, but if you factor in using multiple sets of removable disks in each unit, the price per gigabyte quickly comes down: an extra 5.25 of blank disks costs \$US799. Pinnacle expects the Oray magneto-optical disk system to be used as video servers and database servers.

Christopher Barr

Layered CDs provide more storage

IBM's scientists have developed a layering technique for CD-ROMs that could increase storage densities up to 6.5 gigabytes of information. The technology places clear CD-ROM disks one on top of another to increase capacity. Traditional disks have a capacity of 660 megabytes.

IBM's approach to multilevel disks is to "glue" the individual disks together with spacers between them. "The way we've done this is to actually make a disk with separate data layers, so it is almost like a piece of plywood," said Hal Rosen, co-inventor and group leader at Almaden.

Each of the disks must be partially transparent in order for the laser to penetrate to all the layers in the stack. Therefore, the Almaden researchers strip the aluminum coating from the disks; however, each disk must retain sufficient reflectivity in order to cast back enough light to the disk drive's detectors so the data can be read accurately.

IBM has successfully completed tests with six layers of read-only memory disks and four layers of writable memory. Mr. Rosen said. In order to "attach the disks together," two techniques are employed. For a two layer disk, he said, "we simply take two CDs with the data surfaces on one side of them... and form an air gap structure between them."

"For the six layer disks, we have to use thinner materials. A similar structure is made, but in this case we used

thin substrates about .4mm thick... to form an air gap." He said that .4mm is the size that has been used in the demonstrations, "but it is not a critical parameter."

Rosen said there will be a variety of fields in which this technology will have an impact, such as optical jukeboxes. Other application areas Mr. Rosen mentioned include putting full-length movies on CD, better and longer audio quality and other multimedia applications.

Although price has not been determined, and the technology is a few years off from commercialization, Mr. Rosen foresees "the dollars per megabyte going down as users migrate to these multi-layer disks."

**Monica Snell
Editech International**



Mobile computers to gain smart batteries

National Semiconductor and Energizer Power Systems have joined to create a battery designed for portable electronic devices that will control its own charge and inform the user of its power level.

The 'intelligent battery' will be composed of nickel metal hydride and nickel cadmium. Currently the two companies are focusing on total battery pack solutions for the notebook computer, and solutions which will provide OEMs with flexibility in choosing the configuration. However, the goal is to expand the battery's functionality to include multiple markets such as mobile communications and power tools. The companies, keeping mum on specific technical detail, expect to have a product in testing by Comdex Fall of this year. National is also investigating the possibility of creating a lithium ion battery.

The battery is referred to as the 'intelligent battery' because of an internal microcontroller, said Simon Prutton, National Semiconductor

product marketing manager. The microcontroller will control the battery's charge at a certain rate, its temperature, or voltage. It eliminates the chance of possible abuse through overcharging, and increases the safety of using nickel metal hydride, which according to Prutton has been known to "spontaneously combust".

An internal fuel gauge allows the user to monitor the level of battery charge at any time. Prutton said lab tests have shown the reading to be 98 to 99 per cent accurate; a coup in itself due to the challenge of reading nickel based batteries — the terminal voltage is not proportional to the remaining capacity.

Prutton acknowledged the fact that there are several competitors in this market, but said the intelligent battery will be unique because of its cost-effective architecture.

Duracell, in combination with Intel Corporation, has announced two smart battery specifications, the Smart Battery Data and the System Management Bus.

**Monica Snell
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NETWORKING

Trash video

First there was junk email and voice mail jail, now watch out for trash video. Video messaging, video phones and point to point storable video conferencing will be so prevalent within the next 10 years, according to PictureTel's new Australian managing director Geoff Ward that trash video will be our next generation of information overload.

Speaking at the launch of PictureTel Australia, Mr Ward heralded video conferencing

as the solution to the tyranny that distance holds over Australian business, both across the country and overseas. He said the company expected significant growth in its installed base over the next two years as the market grew to appreciate the benefits of video conferencing.

Mr Ward said the quick uptake of video conferencing, together with the ability to record, store and forward small video messages, like email, could well create a new

avalanche of unwanted material — trash video. "People will record and store all sorts of messages, from simple greetings to information of more substance," he foreshadowed.

On the serious side, he outlined PictureTel's strong market position, quoting research which estimates that 70 per cent of video dialups worldwide are being made on PictureTel equipment, and the Gartner Group's prediction that video conferencing, currently worth around \$US400 million, will be worth close to \$US7 billion within the next five years.

Desktop video conferencing speeds productivity because it helps resolve issues and finalise documentation faster, staff don't have to travel to meet together, saving time and the 'wear and tear' on these key personnel; and offers an ROI compared to ongoing travel costs of six to nine months.

Far from the realm of the Jetsons, he argues, video conferencing and video phones will be standard equipment, even to homes, by the end of the decade. The major inhibiting factor is the pricepoint of



PictureTel managing director Geoff Ward

the videophone, which must fall still further to attract a home market. "Any piece of new technology is not useful to the consumer market unless it can offer good functionality at less than \$1000," Mr Ward asserted.

If this is any indication, then, Australia has some way to go towards videophone ubiquity. PictureTel's desktop systems will have a starting price of \$15,000 (\$6000 in the US), and a high-end 10 station system aimed at distance education providers could cost between \$70,000 and \$100,000, he said.

Helen Dancer



This model offers the most complete and effective solution for individual or small group meetings

TCP/IP networking protocol gaining ground

When TCP/IP was first introduced, it was thought of as only a temporary protocol until OSI was finalised. Now TCP/IP is poised to become the most pervasive transmission protocol in the US.

According to a new survey just completed by the Business Research Group, a research agency based in Newton Massachusetts, by 1996, TCP/IP will overtake IPX as the networking protocol that carries

the largest amount of network traffic.

The BRG study surveyed 350 US companies involved in such industries as health care, manufacturing, government, and finance. Cline said that the majority of users are using TCP/IP to handle such applications as FTP file transfers, SNMP, email, and directory services.

According to BRG, by 1996, TCP/IP will carry 43 per cent of all network traffic, up from 29 per cent in 1994. That com-

parates to IPX, which currently carries 42 per cent of the network load, but will only carry 35 per cent of the networking traffic in 1996. Cline said that DECnet and OSI — which currently carry 10 and five per cent respectively — will carry almost no traffic in the US by 1996. In fact, Cline said that in the US, OSI will carry no network traffic by 1996 and will be only found in application layers such as X.400 and X.500 services.

Aside from TCP/IP's strong

entrenchment in the US, a number of vendors have recently announced products that use TCP/IP — which will add to the growth of the networking protocol over the next few years, said Cline.

For example, Microsoft is developing 32-bit device drivers for TCP/IP and Apple has promised native TCP/IP support in the next version of its operating system.

Mike Moeller
Edittech International

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Internet gets easier to use

A host of new software packages are now emerging that make accessing and finding information on the vast Internet a lot easier.

Trying to tie corporate networks into the Internet is the hope of little-known California Software. Its InterAP provides a fully-integrated and customisable Windows-based application for access the Internet. In addition to providing graphical interface to the Internet, InterAP includes a Visual Basic scripting language called NetScripts that allows

Excel, Word, and MS-Mail. For example, a stock broker could write a macro that automatically generates a mail message any time the value of a client's investments portfolio — maintained in an Excel spreadsheet — changes by more than five per cent.

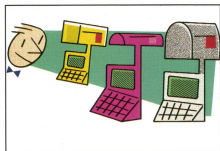
Internet in a Box is a second program that has just come out that provides Windows users an easy access point into the Internet. The software — developed by O'Reilly & Associates — combines such Internet applications as File

Transfer, Telnet, Gopher, Mail, News, and Mosaic into one package. The tools are integrated into a GUI that hides their complexity from the user.

A third offering is from SpyGlass, which is in the process of transforming Mosaic, a graphical interface to the Internet, into a commercial product that can be incorporated by software makers into their own products.

Mosaic was first developed by the University of Illinois as a point and click interface.

Mike Moeller
Edittech International



users to create macros that automatically retrieve information from the wide variety of databases available on the Internet.

Because NetScripts is compatible with both MAPI and Visual Basic, a NetScripts macro can link an Internet server to applications such as

Switching hubs free network bandwidth . . .

These days, planning a network is no easy task. The challenge is providing the bandwidth for data-intensive client/server applications while preserving the investment you've made in current Ethernet, and Token-Ring hardware, all while keeping an eye on the future. The 'switching hub' is one solution that LAN managers are beginning to adopt.

Bluntly put, 10Mbps (Ethernet) and 4 or 16Mbps (Token Ring) just aren't fast enough for voice or video-annotated email over the LAN. More bandwidth is needed as more users join the LAN, companies downsize applications from mainframes to LAN servers, and faster RISC-based PCs demand their slice of the bandwidth.

Sooner or later, you'll need to upgrade or replace your network hardware if you make the move to 100Mbps technology. Several high-speed technologies aimed at increasing bandwidth are here today. There's Fast Ethernet, FDDI, Full-Duplex Switched Ethernet, and 100Base-VG. Even faster Asynchronous Transfer Mode products are expected to ship in quantity next year (data transfer over ATM is scalable into gigabytes).

If the thought of changing adaptors in every machine on your network inspires fear, consider that by using switching hubs you can gain bandwidth without opening the machines. You'll increase your network's overall performance while preserving current adaptors and cabling on the client side.

Switching hubs perform 'microsegmentation' of the LAN: they divide a LAN into multiple, smaller, independent segments and interconnect them at full network speed. This allows for fewer devices on a segment, increasing data transfer speed.

Depending on the size, each department in an organisation could be broken into segments of 10 workstations. When worker A launches a FoxPro database query, the

switching hub is smart enough to know that worker A requires more bandwidth than others on that segment. For that period of time, the switching hub dynamically allocates bandwidth.

Splitting the LAN into subworkgroup (microsegmentation) allows data traffic to be directed anywhere on the network without burdening other PCs.

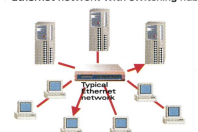
You won't have to worry about hogging bandwidth others need to get their work done thanks to the switching hub's ability to create a 10Mbps data pipeline when you transfer those large files.

Brendon Macaraeg

Typical Ethernet network



Ethernet network with switching hub



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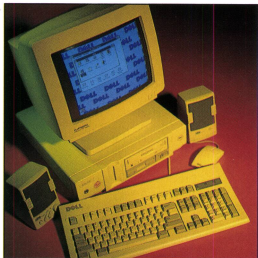
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DELL'S SX2/50 AND DX4/100



Dell has used Intel's new clock-doubled and clock-tripled processors in its latest PCs

Whereas once new processor releases meant generational shifts in performance, this year they're part of a carefully marketed evolutionary process. Instead of opening performance envelopes, now chips simply fill out product lines at strategic price points.

You couldn't find a better case study for this thesis than these two new releases from Dell. Based on Intel's new clock-doubled 486SX2/50 and clock-tripled 486DX4/100 processors, they are well-designed price/performance compromises. Other than the new processors though, they aren't particularly distinguished by either performance or features.

Dell NetPlex 450s/XP

The NetPlex is not a Cannonball Run contender. It is a compact, neatly designed name-brand PC with adequate components, reasonable stock-workstation performance, and an attractive price of \$2495.

The model we reviewed featured a SoundBlaster 16 multimedia kit with Matsushita CD-ROM pre-installed (not included in the \$2495 price), so the only serious deficiency of the unit was evident instantly — lack of expandability. Considering the market this PC is aimed at, though, expansion is unlikely to be a significant selection

criterion. There are only two externally accessible 5.25in drive bays. One is occupied by the 3.5in floppy, and the other, normally free, holds the Matsushita CD-ROM drive. A single 3.5in internal drive bay is nestled slightly behind and to the right of the centrally placed external bays, but still in the forward half of the case, and is occupied by the hard drive.

There are only three ISA slots in total, placed on a daughter card rising from the motherboard and braced by the case's central support. Considering the integrated IDE drive controller and local bus video, though, the three slots are adequate for this market. One of the three was occupied here by the SoundBlaster card.

The case itself is rigid and has a trustworthy feel, with metal braces and rigid cross supports, unlike the low-profile and largely plastic casing used on the OptiPlex, which has a malleable base plate and a flimsy feel. The cabling is tightly packed between the riser card bus slots, power supply and drive bays, with no extraneous wires obscuring the business area of the motherboard. The case lid is removed via four screws along the sides of the unit, which is less preferable than the thumb screws used on the OptiPlex.

The review model featured two full banks of RAM for 8M compared to the standard issue of 4M, and had a 170M drive, as opposed to the advertised configuration of 210M. The drive though is hard to fault. Considering the use of an integrated IDE controller with no cache, the DOS Disk score under PC Bench 8.0 of 415 was a median result for this price point, and the Disk WinMark under WinBench was also median if unspectacular at 369.

The integrated local bus video is based on the Cirrus Logic CL-GD542X. The standard advertised configuration features 512K of video memory, but the unit as tested had 1M. It offered very good DOS performance, with a Video score of 3615.32, which would have sat comfortably among the results from the Pentium PCs we surveyed in the April issue. Under Windows, however, the results were less impressive, if still acceptable and in line with expectations from this video chipset, with a Graphics WinMark of just 6.65. The results were consistent across all resolutions and colour depths, however. Resolutions up to 1280 by 1024 by 256 colours, or 800 by 600 by 64,000 colours were supported with the 1M card. The bundled Mitsubishi 14in Diamond Scan couples well with the display capabilities, although being interlaced only it suffered flicker at 1024 by 768, and was unable to display 1280 by 1024. With its OMO-like image, this is otherwise a satisfying low-end monitor.

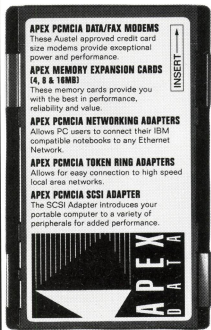
The most interesting part of the NetPlex's performance was its CPU result

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set, however. The processor featured 128K of secondary cache, and this helped it to a Processor score of 28.88, which is excellent considering the narrower 16-bit data path and lack of coprocessor with SX-series chips. It also compares very well with the PCs which this chip will probably replace in market positioning, the 486DX/33. The Processor score for the Compaq Deskpro/M 486DX/33 model is 21.4, and a Dell OptiPlex MXV DX/33 returns a score of 25.2. The combined DOSMark of 387 was in line with or better than that you'd expect from an equivalent DX/33 system.

Like the OptiPlex, the NetPlex is a dream to setup and start running. An on-line 'getting started' system completes the installation of pre-installed operating system components from the hard drive, and offers configuration and customisation tools. The packaging in which these PCs are shipped is also the best organised and easiest to unravel APC has seen, and the least tedious to repack.

Dell OptiPlex 4100/L

The results the \$3995 OptiPlex returned under benchmarking were directly in keeping with the components and configuration chosen, and were solid for its pricepoint.

It's easy to be critical of these results compared to the performance we're now seeing from high-end fully specced Pentiums, or from those we analysed in our April feature, especially in the context of the ongoing argument of whether 486DX4/100 or Pentium 5/6X is the better buy. But this is more a result — not just in terms of performance, but also price — of componentry than platform. For well under half the price, you can't expect the same drive and video equipment, or that you'll be bettering high-end Pentium performance.

The OptiPlex features the new i486DX4/100 chipset, but lacks a secondary cache. This would have impeded the DOS Processor score, pegging it back to 43.11, which is a little above or close to the result you'd expect using a 486DX2/66 with 256K of secondary cache. The Dell OmniPlex 566/L we examined for our April feature, by comparison, returned a Processor score approaching double this, at 80.80.

Likewise, the PCI-based IDE controller integrated on the motherboard, combined with the Western Digital Caviar 170M drive, performed well for the PC's price point, with a DOS Disk score of 466, and a Disk WinMark of 442. But it was left in silicon dust by the OmniPlex 566 from April, which used a PCI-based integrated SCSI-2 controller and drive, and scored 1552 under DOS and 2267 under Windows.

Where the OptiPlex does hold ground

though is video performance. The integrated PCI-based video has 2M of memory, and is based on the Tseng Labs ET4000 W32i chipset. Under DOS, this screams, with a phenomenal Video score of 6566. Under Windows, the results were less exceptional, although still very good, with a Graphic WinMark of 15.4, which would have been just under average in our April Pentium comparative.

The DOSMark was held back by the drive and processor performance though; its rating of 521.61 was in line with a typical high-end configuration of a 486DX2/66 system.

The OptiPlex is physically appealing, and should appeal to administrators for its two-thumbscrew opening case, embedded diagnostics, and clean, spacious internal layout. The case, as stated above, is flimsy, and needs more rigid bracing. As on the NetPlex, the three ISA bus slots are on a riser card from the motherboard. There is also a PCI-bus slot, but this shares the slot from which the riser card emanates, reducing its worth.

The most interesting feature of the OptiPlex internally is a long metallic grill used for the heat sink. Being a lower 3.3V 0.65 micron chipset, the P24C gives off less than half the heat of the Pentium. As a result, there is no chip-mounted heat-sink fan combination, nor even an external fan at the front of the case to draw air out of the motherboard area. Instead, Dell is relying on completely unobscured airspace around the processor, and this long wide gridded heat sink to reduce temperature build up. The same clip on device is used in the NetPlex.

Both PCs featured 8M of RAM, the Mitsubishi 14in monitor, and PS/2-style keyboard and mouse ports, which thankfully leaves the 2 serial ports and parallel port free for their proper duties.

While it's easy to preach boredom at these bolsterers of standard computing, they do give an indication of the consolidation within the industry after a hectic high-end release schedule of Pentiums. If Pentiums were value for money, but out of reach for most of us, the two new processor platforms represented here are deskable from day dot. ▲

Jeremy White

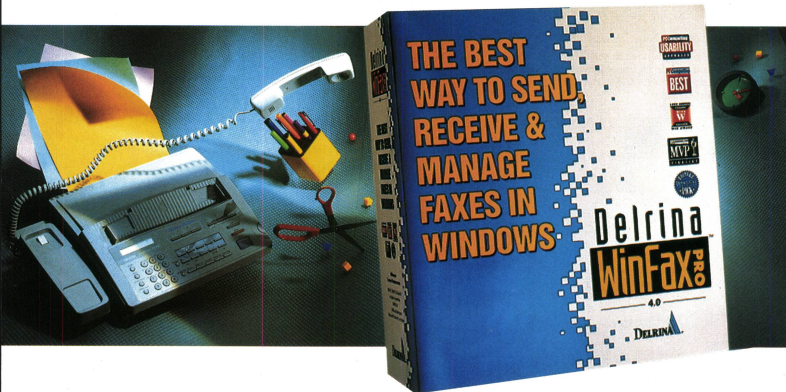
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In short: While unspectacular after Dell's souped up OmniPlex 566/L, these PCs represent a bolster for mainstream computing, with prices affordable for two new processor platforms from day one.

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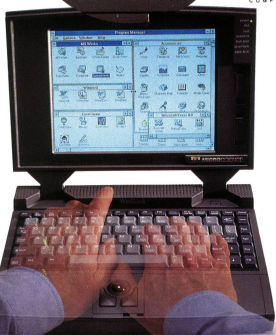
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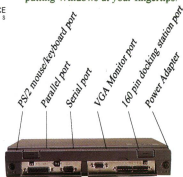
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True Multi-Media at your fingertips

Totally Modular - Fully Upgradable - Multi-Media System in a Notebook

With all of the astonishing features of the Microscience WinBook (SEE opposite page), now you can have a totally built-in Multi-Media system right inside your notebook.

This is an amazing notebook computer. The Multi-Media WinBook has built in stereo speakers, built-in sound card, built-in microphone - everything you need to make powerful and compelling presentations wherever you are - anytime, anywhere, no hooking up speakers, nothing to plug in - just turn it on and away you go with dazzling colour displays with full sound capabilities. It really is fantastic.

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It will blow you away.

Lightweight and slim, the Multi-Media WinBook measures just 44mm high and weighs just 2.7kg. A 9 pin serial port, 25 pin parallel port, EPP support 6 pin mini din external keyboard port, 15 pin VGA port, 160 pin docking station connection, MIC & earphone ports, teline and telephone jacks are all standard.

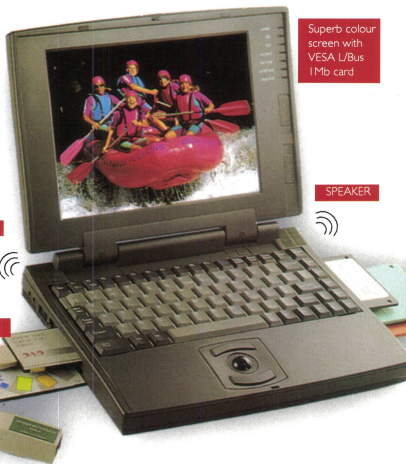
CPU options range from 486SX-25 to the awesome 486DX4-100.

And being fully modular, the keyboard, trackball, RAM card FDD and HDD are removable, and you can upgrade anytime you want.

Even the screen is interchangeable.



Totally Modular



PCMCIA TYPE III

As a true Multi-Media notebook, the WinBook naturally has the optional internal SCSI adapter allowing the connection of a CD-ROM.

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ACCESS 2.0

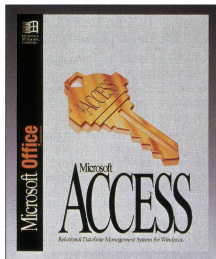
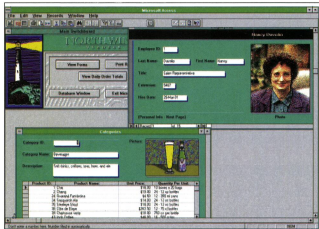
Microsoft has moved aggressively into the PC database market with Access 1.0. It was a powerful offering — an easy to use relational database for Windows, aimed at novice users and developers. Since then, Microsoft has not stood still. In keeping with the design goal of selling one database package for all user groups, Version 2.0 brings improvements in ease of use, power use and application development. With Microsoft's strong capacity to fund R&D, and aggressive pricing through Office bundles and introductory offers, Access is a hard act to keep up with.

The ease of use emphasis is common across Microsoft products — Access opens its arms to people who have not used databases before. Cue Cards walk you through tasks, Wizards will help with table and query design, cross-tabs, finding duplicate records, and much more. And if you find it tiresome to talk to the Wizards about forms and reports, the one click instant form/report option makes a fair guess at what you want.

Making the package easy to use benefits power users as well. For example, you can design queries using the accessible QBE interface, and do useful work if you have never seen SQL before (and don't plan to!). Power users or developers can use the same QBE interface, then lift the SQL it creates to paste it into code or a control property. Similarly, the introduction of Excel-like facilities (like direct sorting) to table views is easy for beginners, and convenient for others.

The many database enhancements include better support for updating tables

With improved database, interface and language support, Access 2 builds on its strong foundations.



Access 2 offers much for developers

through views, queries that modify table structures, and the option of selecting a limited number of records in a query (say, your top 10 sales people). Rushmore query optimisation promises improved performance. Referential integrity support is enhanced.

Access 2 offers much to developers. There are many extensions to Access Basic, including new events and properties (145 of them) for controls. Now Access, like Visual Basic, lets you write code in event procedures, rather than using macros, or functions in separate modules. There is support for OLE Custom Controls (sold separately), and more ways to control applications at runtime — such as variable colour settings, and changing the data source of a subform. It is good to see a number of operations (such as refresh and requery) graduate from being macros to methods. This new version brings better documentation tools for applications and tables — a weak area in earlier versions.

Access system requirements have increased significantly with Version 2. This may concern people upgrading Access on lower grade systems.

Access 2 is a powerful database product, suitable for all types of user. If your target machine is up to it, Access 2 offers many good reasons to upgrade. ▲

Michael Aitken

Distributor: Microsoft
Phone: (02) 870 2200
Price: \$695. Upgrade/crossgrade \$200 (\$170 for Communicate members)
Add Access to Office standard suite \$145 (\$115 for Communicate members).
Bundled with Microsoft Office Professional (\$875 total price)

In short: This wide-ranging upgrade makes a good database product better. There are plenty of reasons for novices, power users and developers to upgrade.

The Monitor that Majors in Ecology



Exclusive to Edge Technology

The KTX Caretta monitor specialises in environment protection via its low radiation MPRII standard and energy conscious Power Saver function.

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- Microprocessor control panel with memory to store your screen settings. Plus, digital controls within easy reach for adjusting contrast, brightness, and horizontal/vertical frequencies etc.

- Extensive application with a range of hardware platforms, work station modes and video standards (from VGA to 1280 x 1024 non-interlaced).

Edge also carry a full range of 14" monitors. These include SVGA, Non Interlaced and Low Radiation. So invest in the environmentally friendly monitor with a KTX Caretta from Edge Technology.



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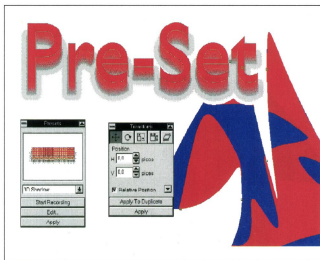
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Presets are macros that can automate any type of drawing action; allowing this type of 3-D drop shadow to be applied with a single click. The red and blue curve (right) was created by PowerClipping two freehand curves together. Also pictured is the new improved Transform roll-up

CORELDRAW 5.0

CorelDRAW 5.0 includes improved versions of existing add-ons plus several new ones, including CorelKERN (for editing font kerning pairs), CorelQUERY (for working with database files), and CorelVENTURA 5.0. The CD-ROM version will include Ares FontMinder, Adobe Acrobat and additional clip-art and fonts. These extra products make CorelDRAW 5.0 exceptional value (even at \$1295), and important new features have been added to CorelDRAW itself.

New features include PowerClips, which allow you to place one object 'inside' another by defining the container object as a clipping path. Corel's new Len-

ses add new types of fill to objects; these can be semi-transparent screens of any colour, or special effects such as 'brighten', 'invert' and 'magnify'. Lenses make achieving subtle, transparent shadings simple; particularly impressive because such effects are normally very tedious to obtain with vector-based drawing programs.

A third major new feature is Pre-sets. This is a simple macro recorder which allows you to save a sequence of drawing steps as a named Pre-set. If you need to draw complex items several times or apply time-consuming effects, creating a Pre-set will save you hours.

As well as new features, existing ones have been improved. The Dimensioning tools, for producing accurate scale drawings, have been significantly enhanced. As have the various transformation tools, such as move, skew and rotate. These are now grouped as a single 'Transform' roll-up, which has a series of buttons across the top that are used to select the transformation you need. A new 'position' option has been added, which allows you to specify precise co-ordinates for an object.

Corel's new colour engine allows users to calibrate their monitors, scanners and printers for more accurate colour. Once

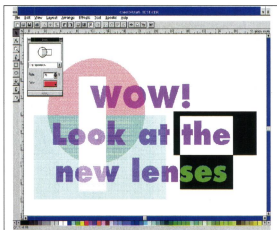
your setup has been calibrated the settings are stored and can be used by the entire family of Corel products.

Anyone with experience of past CorelDRAW versions will inevitably be worrying about speed and disk space. Corel claims an overall gain in speed and performance. This was hard to assess accurately in the late beta version reviewed, but certainly Corel 5.0 seems as quick as version 4.0 (no mean feat, given the number of new features), and certain features — particularly paragraph text — seem much faster. How much disk space the new version will need is hard to say; the different programs share more code than before, which should save space (for example; Ventura 5.0 and CorelDRAW 5.0 share a feature called TypeAssist which corrects things like straight quotes and superfluous spaces). However, all the new features and programs will probably require extra disk space. ▲

Jim Endersby

*Distributors: Merisel, Tech Pacific
Phone: (02) 882 8888, (02) 697 8666
Price: \$1295. Upgrades: from 3.0 to 5.0 \$799; from 4.0 to 5.0 \$395; CD-ROM only upgrades from 3.0 to 5.0 \$599; from 4.0 to 5.0 \$345. Registered users of Corel Ventura 4.2 will also be able to upgrade to the full CorelDRAW 5.0 package (including Ventura 5.0) for the same cost as from CorelDRAW 3.0.*

In short: A very exciting improvement to an already strong product. For the power user who is serious about illustration, CorelDRAW 5.0 looks like the best computer graphics package there is. It's worth noting, however, that Corel is committed to keeping both versions 3.0 and 4.0 alive, so that users who don't need all the extras will be able to choose the CorelDRAW that suits their needs.



The new lens feature in Corel 5.0 makes complex effects simple

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VISUAL REALITY

Visual Reality for Windows is a collection of five modules that make up a complete 3-D toolkit. You also get two CD-ROMs containing a wide variety of 3-D clip art and images for use as fills and textures.

Visual Reality is relatively easy for the part-time or occasional 3-D artist to use. Drag-and-drop operations, button bars, and context-sensitive help get the new user through the transition between 2-D and 3-D operations, and a well-designed set of tutorials and manuals go a long way toward taking the mystery out of working in three dimensions.

Renderize Live

The hub of the program is Renderize Live, a much improved version of Visual Software's Renderize for Windows that uses a studio-like metaphor. You adjust lighting and move a virtual camera around 3-D objects with your mouse to get just the right view and effect. Visual Reality gives you almost total control over every aspect of the virtual 3-D world, including surface materials, fills, object shading, colour, and texture.

A master window, called the Viewport, provides WYSIWYG views of your work as well as access to the program's main tools. Some controls are very intuitive, but others require practise for those not used to a 3-D workspace. As you change from one mode

to another, toolbars on the top of the Viewport change.

Let's say you want to render an image of a room. You give furniture wood

to run .FLI and .FLC files, and you can also run presentations using Autodesk's Animation Player and the Windows Media Player. Individual drawings are exportable in BMP, EPS, .GIF, native .RAW, SUN Raster, Targa, and TIFF formats.

You bring wireframe objects into Renderize Live from AutoCAD .DXF or waveform .OBJ files, as well as from the program's own Visual Model wireframe designer. This module lets you create 3-D models, as well as edit 3-D clip art or elements created in other applications for use in your projects. The two CD-ROMs included with the program contain over 500 images along with common textures and backgrounds.

Visual Image

Visual Image is a multilayer bit-map editor that has many of the same tools as paint programs. The module uses the same combination of toolbars coupled with drag-and-drop operations. It has two modes: the Image Mode works much like any bit-

map editor, and the Object Mode is used to create collages and work on individual images within a collage.

Visual Font is a slick utility that can extrude text from any Windows True Type font or symbol collection into a 3-D object, which you then edit in Renderize Live. It took us just a few minutes to create a smooth animation of a logo drawn using Visual Font against a bitmapped background.

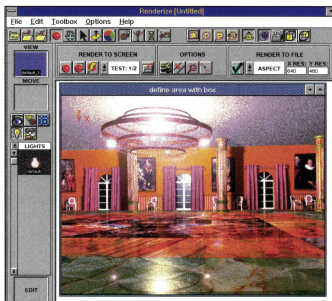
Renderize Live demands heavy-duty hardware. It's a full-blown 32-bit application that pushes Windows and DOS to their limits. While the program will run on a 386 with a coprocessor and an 8-bit graphics card, it really needs a 486 with a fast hard disk and a 24-bit true-colour display adaptor to match. ▲

James Karney

Distributor: Lako Vision

Phone: (03) 525 2788

Price: Visual Reality for Windows, \$1190. In short: Visual Reality's modules are very well integrated and together constitute a powerful graphics and animation tool.



RENDERIZE LIVE: This image by Fredric Bertrand shows the flexibility of Visual Reality's 3-D rendering tools

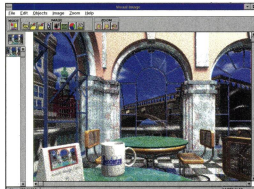
finishes with a polished sheen by manipulating the attributes of the material. The 32-bit colour model used by Visual Reality can also make a material such as glass transparent.

Cool lighting effects

The lighting controls are excellent. You create and position all types of lights, from narrow spots and barn doors to complex soft boxes — virtually anything a photographer could imagine. While 2-D objects can be used in Visual Reality projects and even placed in scenes to cast realistic shadows, they cannot be rotated for different views the way 3-D objects can.

Lights and a camera can move all around objects, whether freely on all axes or rotated around a fixed target. The view from the camera is one that will be seen by the viewer, filled, and lit, after you render the view. This is especially useful when creating animations.

You use the Visual Player module



VISUAL IMAGE: Edit bitmapped images and use them as objects in photorealistic collages

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ISO-9001



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People Committed To InfoTech

NETCOMM SMARTMODEM V8

First cab off the rank in the race for the V.FAST modem market is Australian company NetComm, which has come out with an impressive, full-featured modem even before the international controlling body, ITU-T, has ratified the V.34 modem protocol standard.

Aggressively priced at \$1199, the SmartModem V8 is built for high speed data trans-

mission; call re-routing to pre-determined numbers like a paging service and answering machine; and remote call retrieval. At a pinch you could even set up a touchtone answering service. This is the first of the V.FAST class modems approved by Austel. It boasts voice capabilities as its particular standout feature as well as the more conventional properties like fax and data.

The complex Cooeee interface Windows comms package bundled with the V8 takes a bit of configuring, but once that's done, you can take advantage of a unique feature set called the Electronic Secretary. This can take your calls, store your faxes, re-route and play back your messages, and collect incoming data. You can also record your own messages by plugging in a phone handset. Don't expect anything too fancy and you should be able to muddle your way through it.

Operating the package has some prerequisites. For

optimal use, you need a 386DX/25 equipped with a 16550 UART chip, 4M RAM, Windows and VGA or better.

The user interface needs some work done to it — setting up a new dial-in service means going to File New and selecting from a bewildering array of object types, after which you still need to enter the number and other dialling details. This appears under File Properties. The SmartModem V8 has real potential for anyone contemplating upgrading to the V.34 standard, and with the best conditions possible, the data capabilities live up to the claims for port speeds of 115.2k baud — provided also that there is a similarly equipped V.FAST class modem at the other end. ▲

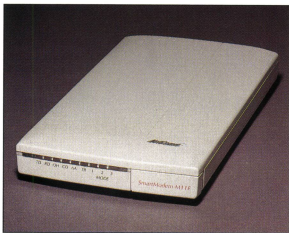
David Lin

Distributor: NetComm Australia

Phone: (02) 888 5533

Price: \$1199

In short: While the competitive products claim throughput advantages using a variety of devices, the built-in V.42 and V.42bis error correction and data compression respectively are the sole agents pushing through the data.



The SmartModem V8 has potential for those upgrading to V.34 standard

ACER MATE 433SG

Green PCs are rapidly redefining the way we think about desktop computing and the environment. Using power down features and 100 per cent recyclable packaging materials, Acer is one of the leaders in the green PC revolution.

Peripherals such as the hard drive and monitor can be shut down after predetermined times of inactivity. With access to the initial setup screens the user can either disable these features or set the specific timers for powering down component subsystems. Acer claims that over a period of one year this can result in a power saving of up to 50 per cent.

Another noticeable and innovative feature is the desktop case. It features detachable feet which can be moved so the unit can be mounted either as a desktop machine or a tower system. By using snap together componentry the cover is easily removable and most internal components can be replaced without the use of tools.

The system motherboard is based around Intel's 486SX-33 processor with 4M of RAM. Using two 72 pin SIMM sockets the system RAM can be increased to 36M and up to 256K of secondary level cache can be added to enhance memory throughput.

The system board also incorporates a VESA VL-bus on which both the graphics and IDE controller are located. The graphics controller is based on the Cirrus Logic chipset with the option of upgrading the video memory from 512K to 2M.

The hard drive subsystem consists of an uncached IDE controller and a 210M Seagate drive.

With all I/O functions on the motherboard the unit has four spare ISA slots on a vertical riser board and two empty 5.25in drive bays allowing for further expansion or upgrading to multimedia specifications with the addition of a soundcard and CD-ROM drive.

Acer offers a three-year warranty with



its machines; the first year covers parts and labour and the second and third years are for parts only. ▲

Stuart Bowman

Distributor: Acer

Phone: (02) 870 1999

Price: \$2552

In short: An inexpensive machine that uses the latest in both bus and 'green' power saving technologies.

If you've ever owned a copy of Norton Utilities® you know you don't need a super-hero's cape to have magic-like powers.

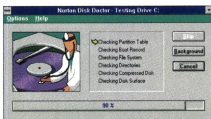
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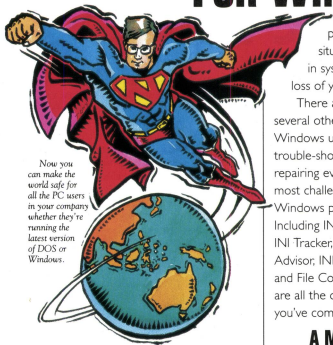


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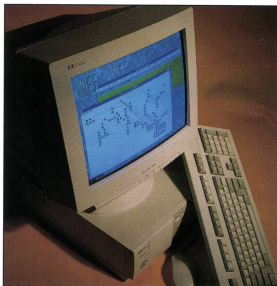
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SYM86



The Vectra takes advantage of 64-bit data paths and PCI bus technology

HP VECTRA PC SERIES

The HP Vectra PC series is targeted for users of graphics intensive applications and Windows NT. Based around and designed specifically for Intel's 60MHz Pentium processor, the Vectra takes advantage of 64 bit data paths and PCI bus technology.

One of the outstanding features of this machine is the Ultra VGA2/PCI 64 bit true colour video subsystem. Equipped with 2M of RAM and a resolution of 1024 by 768 with 64K colours, the card scored an impressive 15.2 Graphics Winmarks in our Windows software benchmarks. With 4M of RAM the card is capable of resolutions of 1600 by 1200 with 64K colours, and 1024 by 768 with 16.7M colours. The evaluation unit came with a 17in HP monitor, \$2251, which performed well under the test con-

ditions and with its on-screen colour and picture controls. All features of the monitor are easily adjustable.

The hard disk controller is also located on the PCI bus and supports a 450M, 12ms hard drive. This also performed extremely well on our tests with a Diskmark of 2030. For those who need the extra storage and speed a SCSI-2 1G drive is available.

A 64 bit data path is used between the processor, memory and cache. This bus runs at the speed of the processor and is capable of transferring 540Mbit/sec. The Vectra with 8M (expandable to 192) of RAM and a 256K second level write back cache scored a Winstone of 57.5.

Standard on the Vectra series is an on-board RJ-45 network port for connection

to 10Base-T networks. The Ethernet port is switchless and uses bus master DMA mode for faster transfers between the PC and network.

Also included in the package are extra features such as a bi-directional Centronics port and an infrared port for serial communications up to 115K baud. HP has thrown in its Dashboard, Windows management software and includes a three-year warranty and toll free support.▲

Stuart Bowman

Distributor: Hewlett Packard

Phone: (03) 272 2895

Price: \$9543 excluding monitor

In short: A high end graphics workstation and desktop machine for power users on the network.

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- Speaker ● Hayes compatible ... there's a **Simplemodem** with the exact features and speed you need ... at exceptional value for money!

24f/96f/144f



Simplemodems are designed by NetComm co-founder and AWARD WINNING DESIGNER, RAY RODRICK, partner of Simplecomputing Australia Pty Ltd, Sydney



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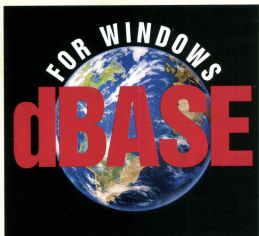
For details/stockists contact Simplecomputing™ Australia Pty Ltd (ACN 059 983 574) Phone: (02) 484 0089, Fax: (02) 484 3617.

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Why dBASE is the best way to build database applications for Windows

Borland will soon release the most extended and powerful dBASE® ever produced. It will provide exciting new capabilities for managing your data, while leveraging the knowledge and skills you already have. It will set the standard for data management and applications development for years to come. This first article in a three-part series gives you an overview of dBASE for Windows.



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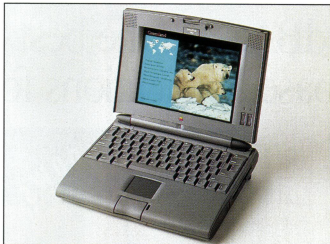
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Lust and envy might be deadly sins, but they are the emotions engendered by Apple's new high-end laptop. With styling that's at home in the cafes of South Yarra or Paddington (and a pricetag to match), the 540c catches up with the changes in laptop design over the last three years and breaks fresh ground with new technical features.

Apart from the sleek new lines, the most noticeable change from previous PowerBooks is the replacement of the trackball with Apple's new trackpad. This small rectangle detects changes in capacitance as a finger moves across its surface. As the trackpad is speed-sensitive, slow fingertip movement gives precision



The new Macintosh PowerBook 540c features Apple's new trackpad technology, replacing the trackball

MACINTOSH POWERBOOK 540C

cursor placement while a quick flick moves the pointer the full width or depth of the screen. The pad seemed strange at first, but after surprisingly few minutes of use I came to like it (along with the idea of having no rollers to clean).

The active-matrix colour screen is bright and sharp with a wide viewing angle. The 540c supports 8-bit colour at 640 by 480 pixels, or 16-bit colour at 640 by 400, and resolution and bit depth can be changed without having to restart.

A pair of stereo speakers and a microphone form a triangle around the screen. External monitors up to 17in (8-bit colour) are supported in either mirror or second-screen configurations; unfortunately the video adaptor cable was missing from the review machine. Unlike earlier PowerBooks, the 540c takes a second battery (although this too was missing from our unit). It uses the new Intelligent Battery, a NiMH pack with its own processor that assists in power management. Apple claims up to six hours of use from a pair of batteries.

My limited experience with the 540c suggests this is optimistic; without careful power conservation, one battery lasted about an hour and a half. The good news is that the AC adaptor can charge both batteries simultaneously, or power the computer while charging each cell in turn. The second battery bay can alternatively

be used for expansion cards. An LC-style PDS slot allows installation of cards specific to the 500 series (if and when they appear), and a two-card PCMCIA adaptor has been announced.

There's also a motherboard connector for a Duo-style internal modem. The 540c is roughly the same size and weight as its PowerBook predecessors, but it benefits from a slightly larger keyboard with a row of 12 function keys and a pitch matching Apple's desktop keyboards. With serial (printer, modem or LocalTalk), SCSI, stereo sound in and out, ADB, video and Ethernet ports, the 540c provides a complete set of Mac interfaces.

The 33MHz 68LC040 provides good performance (better than a PowerBook 180c and comparable to the Quadra 610) except for the lack of a floating-point unit. Expect to see a PowerPC upgrade in six months or so, as a plug-in replacement for the 68LC040 daughtercard. Software consists of System 7.1.1 plus PC Exchange (to mount DOS-formatted diskettes), File Assistant (a file-synchronisation program) and Control Strip.

The latter keeps an icon bar onscreen which gives instant access to important controls such as sleep, hard-disk spindown, file sharing and battery gauges. It has a modular architecture so third parties can add functions. I can only think of three reasons for not buying the 540c: you don't want a notebook

computer, you don't want a Macintosh, or you can't afford \$7495. Apple can't do anything about the first two, but the somewhat slower 520c is \$2000 cheaper.▲

Stephen Withers

Distributor: Apple

Phone: (02) 452 8000

Price: \$7495

In short: A powerful and innovative machine that restores Apple's leadership in laptop design. Some users will be disappointed by the absence of a floating-point unit, but the system is future-proofed to a large extent by the promised PowerPC upgrade.

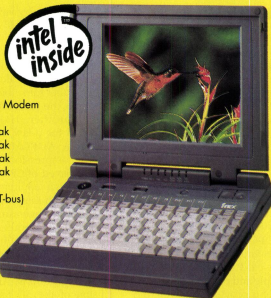
Benchmarks: We used Ziff-Davis' MacBench 1.0 to test the PowerBook 540c with its standard 8M of RAM and 320M hard disk. The built-in display was set to 640 by 480 pixels and 256 colours. Higher numbers indicate better performance.

Benchmarks			
	PowerBook 540c	LC III	PowerBook 180c
Disk Mix	12	10	13
Video Mix	11	10	5
Processor	41	10	13
Floating point	45	10	182

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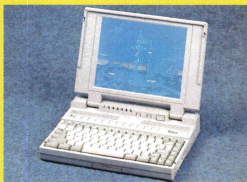
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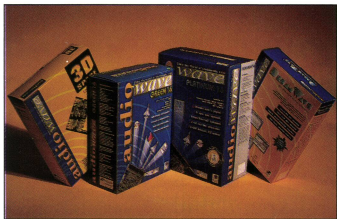
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The new range of SoundBlaster compatible audio cards costs under \$200

NEW AUDIO CARDS

AudioWave has released a new range of SoundBlaster compatible audio cards and upgrade options that will bring 16 bit sound to the PC for under \$200.

The Green 16 is an entry level, low power 16 bit card. For \$195 you get a SoundBlaster Pro and Windows Sound System compatible soundcard that can record and play 8/16 bit stereo/mono signals. With a multi-CD (Panasonic, Mitsumi, Sony) interface and SCSI upgradability, connecting the card to a CD-ROM unit should be a simple and painless operation. A 16-way socket is provided allowing the

user to upgrade to wave table technology. Using a Yamaha YM762 synthesiser chip the card is capable of 20 voice stereo sound. The package is bundled with 10 audio utilities, ranging from audio recorders to talking calculators.

With the same basic features as the Green 16, the Platinum 16 is a feature rich bigger brother. Hardware support is provided for u-law, A-law, SoundBlaster and IMA ADPCM realtime compression/decompression; this allows the CPU to be relieved of CPU-intensive DECOMP tasks and is a requirement for MPC II compliance. With sampling rates up to 48KHz and 64 times oversampling, the Platinum is capable of reproducing high fidelity CD quality output. With MPU-401 compatibility and easy Wave table upgradability the card can be used for all your MIDI applications. An option is the inclusion of the 3D Space daughterboard which increases the spatial soundscape of your games and audio software. Included with the system is the Windows Sound System software package for voice recognition and sound recording.

The Dream Wave is a WaveBlaster compatible daughterboard that can be used to gain MPU 401 compatibility and to access wave table technology that has until recently only been available on more expensive cards. Featuring 16 channels and 227 acoustic samples the wave table is compatible with MPU 401 and general MIDI standards.

The AudioWave range of cards lets you select the features you need for your sound applications without having to pay the overhead for features that you may never use. ▲

Stuart Bowman

*Distributor: Multimedia Technology
Phone: (03) 853 6700*

*Price: Green 16 \$195; Platinum 16 \$250;
Dream Wave \$195; 3D Space \$82.*

In short: A cheap and affordable means of obtaining 16-bit sound for the PC. Ideal for voice recognition or avid games players.

SOUND BLASTER AWE32

A features war has broken out among sound cards. Creative Labs' new \$599 Sound Blaster AWE32 includes enhanced MIDI sampling, speech and voice processing, and special effects such as 3-D surround-sound to help it compete with high-end, companies like Turtle Beach.

Based on the Emu Systems EMU8000 upgradable audio DSP, the AWE32 is a full CD-audio-quality card with 8 and 16-bit recording and playback, 32 simultaneous wave-table voices, standard FM music synthesis, and 128 general MIDI samples. Its programmable DSP features compression algorithms for processing text-to-speech data and enables the card's QSound surround-sound 3-D audio, along with reverb and chorus effects.

Creative Labs long ago mastered the art of fast and easy installation. Despite the half-dozen disks you have to load, it doesn't take much to get the new Sound Blaster up and running. Sound quality for

the AWE32 is a close match for any card in its price range, though the sharpness of its Roland MPU-401/MT 32-compatible MIDI output remains its obvious strength.

The AWE32's 10-channel mixer handles 4-watts per channel of amplified stereo output, while its complete array of I/O jacks give you a range of sampling and playback options. These include CD-ROM interface connectors for Creative Labs (Panasonic), and Sony and Mitsumi double-speed drives. In addition, you get lines in and out for microphone, CD players and speakers. The external MIDI port doubles as a joystick connector, too.

Greg Pastrick

*Distributor: Computamart
Phone: (02) 906 8887
Price: \$599*

In short: The Sound Blaster AWE32 represents a significant upgrade from existing 16-bit Sound Blaster cards, and that's what brings it closer to Turtle Beach territory.



The stunning display on the NEC MultiSync 6FGp

MULTISYNC 6FGp

NEC's acclaimed MultiSync brand name monitors have consistently polled awards for their functionality, ergonomics and sheer usability. The latest series of releases have kept the NEC MultiSync tradition alive while matching the Energy Star conditions. The MultiSync 6FGp is the top of the range product.

The bald specs tell of a technically excellent display. A 21in screen, an enormous expanse of graphical real estate meaning 20 per cent more usable space than its 20in predecessor, heads the list. Refresh rates of 55 to 90Hz mean less chance of users suffering from the effects of flicker and the 6FGp will accommodate a resolution of up to 1280 by 1024 pixels non-interlaced. Digital controls mounted at the front for easy access include size of screen display, position, choice of colour settings which are user defined and stored in memory, degaussing and pin cushion effect adjustment.

Compliance with the requirements of the Swedish MPR II standard is one of the badges the 6FGp shares with all of the current NEC MultiSyncs. DPMS (Display Power Management Signalling) and VESA standards have been implemented. Working with similarly specified display adaptors and CPUs, and enabled by NEC's IPM (Intelligent Power Management) system built into the logic of the monitor, Energy Star requirements are met.

The 6FGp's colour saturation was gorgeous. The picture was defined and occupied the entire expanse of the screen edge to edge. Glare from ambient light is minimal due to NEC's OptiClear bonding of the screen. At maximum resolution using a 9GX64 accelerator card with 4M VRAM, Windows was simply breathtaking with not a sign of bad definition.

The privilege of using one of these beauties is not without cost. Think about lifting a 35kg weight around and you will have some idea of the physical requirements needed to house one of the 6FGps. Then we also had enormous difficulty with the VGA plug. Our first choice of computer had to be rejected because the plug could not engage the screws for a good connection to the computer, a complaint that is common with the plugs NEC use on its MultiSyncs.

A price tag of \$5499 makes for a rather expensive luxury for the majority of us or a reasonable outlay for the professional with the real life need for a high-end display.▲

David Lin

Distributor: NEC Home Electronics

Phone: (02) 868 1811

Price: \$5499

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Colour	486DX2-40MHz	4MB RAM/200MB HDD
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* RAM expandable to 20MB with optional memory.

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From Cyberia with love

There is a hardback with a transparent plastic dust jacket lurking on the computer shelves in some bookshops now. This volume has a psychedelic/Von Daniken-type cover and glories in the name *Cyberia*.

At first I was impressed by the title but now it irritates me. I picked the book up after only a few minutes inspection. I had only moments in the bookshop and I needed something to read on a long journey. The catchy title promised much but the book delivers little.

Let me just quote one sentence from the book: "As computer programmers and psychedelic warriors together realise that 'all is one', a common belief emerges that the evolution of humanity has been a wilful progression toward the construction of Cyberia, the next dimensional home for consciousness". If you enjoyed that, there is plenty more where it came from. In fact you can get 230 pages more of it (I've checked).

Maybe I am getting old, but when I read that sort of pseudo-philosophical religious rubbish in an introduction I find it very hard to get enthusiastic about the rest of the book. I have in fact dipped into various chapters in hope of finding some information, but I have been disappointed.

Sitting right next to *Cyberia* on the shelves is a book that puts it to shame. This is Howard Rheingold's *The Virtual Community*.

The books are virtually indistinguishable. The titles mean the same and they are both packaged in the publisher's idea of futurist art.

However, Rheingold's book is thoughtful

and useful. Rheingold is a veteran of the online world, having spent eight or nine years in various online communities. In contrast, Douglas Rushkoff, the author of *Cyberia*, is an outsider, he is reporting on other people's experiences. He is talking to kids who themselves have only a few years experience with the online world (and drugs).

While the people Rheingold talked to have their own vision of what is happening, I suspect that it is Rheingold's more mature users who are really driving the direction of the Internet. Rheingold describes it as a medium for "human discourse" rather than some "world brain".

There is, of course, plenty of dross on the Internet. There are no filters or censorship and so from extreme philosophies to extreme sexualities, you will find it all there. As well, some of the information is wrong, misleading or just slightly inaccurate.

But the things that make it worthwhile connecting to the Internet are the communication and the information. These are there as a result of the ordinary users, the academics, the business people and so on, not because of the cyberpunks and zippies that Rushkoff talks about.

Promoting these people as heroes as Rushkoff wants to do is misguided. In reality these people contribute little to the Internet. They use it but don't bother to give anything back.

I don't doubt that we occasionally need people like Rushkoff and the cyberpunks to shake us out of our complacency. However the Internet is not a thing/place that many people are complacent about. Not only does the Internet generate its debate internally about things like TCP/IP and ATM, but the Internet is the centre of an external debate about how much it is the information superhighway of tomorrow.

There are plenty of people who would argue that the Internet is already an information highway. They say that it forms the natural basis for any advanced worldwide network.

In contrast there are others who say that it does not have the bandwidth or structure to be the superhighway. These are the people who want to make money out of the superhighway and see that there are no toll booths on the Internet. Books like *Cyberia* strengthen these people's hand. ▲



BY JEREMY HOREY

The Internet is the centre of an external debate about how much it is the information superhighway of tomorrow.



Illustration by J. D. King

Green eggs and ham



BY HELEN DANCER

The education lobby arguing against books on CD-ROM is, like many other factions in the superhighway debate, missing the point.

Can you imagine what a hard time Mrs Gutenberg must have had from the community around her when her husband invented the printing press?

"What's he trying to do Gertrude? Undermine our role as parents? Why, with books, they won't have to rely on oral learning for their development, instead of learning from us all they'll need to do is read a book! They won't listen to us anymore, we'll be redundant. It's the thin end of the wedge, them book things will be the end of civilisation as we know it!"

When television was introduced in the 1950s and popularised in the 1960s, there was a similar outcry. "This will signal the death of the printed word. Bookshops will become redundant, TV will tell us everything we need to know, reading will die out!" Hmm — Channel 7 may well claim to have the who's who of news, but this little black duck believes there has to be more.

Which would you rather have on the beach? A paperback or a notebook with a screen which picks up every ray of sunshine and sends it hurtling into your eyes, making reading much more of a chore than a pleasure.

No prizes for guessing which most of us would rather have.

Now, of course, we are hearing the same concerns expressed from those who would defend the paper-based word from the onslaught of CD-ROM — that books on CD-ROM, such as the much publicised translation to the electronic medium of the much loved Dr Seuss library, will spell the end of parent/child reading time, and the nurturing and relationship building value ascribed to that time. Donald Roberts, chairman of Stamford University's Department of Communications has expressed the view that there are important sociological aspects to the parent/child reading time which cannot be replaced by a computer (no-one would contest this point, I imagine), and he further implies that the advent of children's books on CD-ROM will mark the end of this reading time, with detrimental socio-developmental consequences.

When we look at the argument more closely however, it has the air of a plateful of green eggs and ham. It is not in the nature of any parent prepared to spend thousands of dollars on a computer for a child, to ignore the other needs that child may have, or indeed deny their own nurturing instincts which drove them to have children in the first place. Dr Ken Sinclair,

head of the School of Educational Psychology, Measurement and technology at the University of Sydney asserts that parent/child time is driven as much by children as by their parents. CD-ROM, he feels, will not detract from the significance of the relationship between parent and child that is gleaned from time spent reading together; rather it will enhance their ability to interact together with the learning medium. With a book, he says, a person is active in reading it but passive in every other way. A book on CD is much more interactive, thus the move to PC-based 'books' is a logical, albeit much more powerful extension to the oral tradition/books evolution.

And it doesn't logically follow that the one-child-one-computer rule should apply. There is no reason, Dr Sinclair opines, why children shouldn't be encouraged to work collaboratively; in fact there is more benefit to learning if children are encouraged to collaborate on a project or piece of software than if they are set the task in isolation.

Neither will PC technology replace altogether the books and tools currently used in schools, and that's not the aim. Pens and paper, he asserts, in combination, represent cognitive technology, and will not be phased out, or become irrelevant to the learning process. It is not a black and white argument, this or that, paper or silicon, to read or to see or to hear.

In the real-world beyond the canteen and the bike sheds, a great deal of such green eggs and ham philosophy is being propagated about the information superhighway. Set top converters, shoe phones, wireless wristwatch modems, information on-line, the much-touted video on demand, won't turn us all into latter-day Jetson families — it will simply offer information alternatives.

But in fact the advent of PC-based information access may well serve to redress the existing problem of the information poor. In the US the US News and World Report records the Kelsey Group's finding that almost half of American 18 to 24 year olds don't read newspapers. The corollary of this is not that they get full and objective news and views coverage from their PCs or other sources — it simply indicates that they are currently deprived of the information available in this media. As the computer literate population grows more mature, PCs well may represent a valuable forum rather than a threat. ▲



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The Internet beckons



BY BILL MACHRONE

I felt like the last person to get onto the Internet. With all of the talk about electron superhighways and whatnot, I felt I was missing something.

Not that I don't get enough electronic mail via Lotus Notes, MCI Mail, and CompuServe/ZiffNet. Not that I don't spend enough hours on-line browsing databases and engaging in electronic conversations. I still felt that there was something missing; that people were having some kind of metaconversation that I kept hearing about but couldn't participate in.

The obstacles to getting onto the Internet are many and varied. If you just want to see what's going on out there, I recommend you try one of the service providers with an Internet link, such as Delphi or The Pipeline. Even then, you won't see all of it. Different services tap into different aspects of the Internet. You might be most interested in the news groups, the ongoing conversations that range from the sublime to the ridiculous. Or you may want to see the incredible array of information out there in graphical and hypertextual form; if so, you want to be part of the World-Wide Web.

One of the technical analysts at US publication, *PC Week*, has put up a Web server. Through a high-speed data line and some truly interesting Firefox software that runs TCP/IP over a NetWare LAN without having the TCP protocol stacks loaded on individual machines, I can access that server and the Web. The Web is inherently multimedia. It understands a variety of text, hypertext, graphics, and sound files. The viewer interprets some of these files directly and loads programs dynamically to allow you to view/see/hear other formats.

One of the best windows onto the Web is a program called Mosaic; it runs on PCs, Macs, and X Window terminals. Written by Chris Wilson at NCSA (the National Centre for Supercomputing Activities, located at the University of Illinois), Mosaic is a work in progress that is freely distributed to encourage more widespread use of the Web. Virtually every component is available as freeware, including a public-domain version of Unix. The Web itself was designed at CERN (the European Organisation for Nuclear Research) and has become an international standard.

The best way to describe the Web is as a trip to the library, but you've never been in one like this before. The shelves are run by different

volunteers and vary greatly in their offerings. Each shelf is on a different server, in far-flung locations. In the course of browsing, you cross oceans and continents. The Internet does it all quickly and conveniently — the electronic equivalent of seven-league boots.

The Web servers are run largely by college students. Thus, you must be prepared for a heavy dollop of quirky humour with your information. The prevailing ethic of running a Web server is that you provide a home page (with information about your organisation and the kinds of things on the server) and a personal page (with information about yourself). Most system operators include scanned photos of themselves, their families, their dogs, and so on. Others get quite artistic. The portrait of one fellow at Michigan State University, for instance, is a rather ominous close-up of his eye. Another is silhouetted against a snow-dappled mountain peak.

Even commercial servers have some public-service files or popular files to cut down on network traffic. One of IBM's Web servers, for example, has a database of missing children on it.

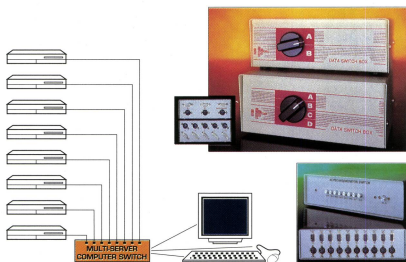
Unlike MCI Mail, where the emphasis is on mail messages, or CompuServe or America On-line, where conversation rules the day, the Web is essentially read-only. You can leave comments for operators and fill out the occasional form, but the emphasis is on navigation and information retrieval. The stunning thing is the nearly infinite variety of information. You can read or download academic and scientific papers, track the progress of standards committees, get answers to FAQs (frequently asked questions) on almost any topic, and get access to many electronic reference materials. What you won't see is much copyrighted material, at least not in written form.

Pictures are a different story. You'll find an incredible array of scanned photographs on virtually any topic. Nobody seems very worried about copyright, especially when you've crossed borders and the server is in another country. For instance, one server has a sub-directory filled with JPEG and GIF images of

To page 54

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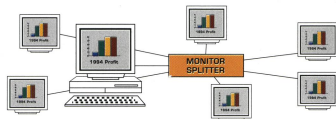


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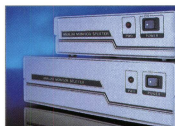
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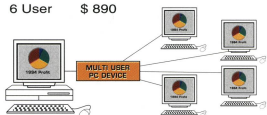


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Endgame? Hardly!



BY MICHAEL MILLER

For a while, it seemed as if you couldn't pick up the paper without reading about the consolidation of two or more computer software companies.

It's been all over the news, but if for some reason you've missed it, here's a quick recap: Electronic Arts has agreed to buy Broderbund, Adobe has agreed to buy Aldus, Novell is buying WordPerfect, as well as Borland's Quattro Pro business, and Symantec has set its sights on Central Point Software.

Lots of analysts and news reporters look at what's going on and conclude that the consolidation of these companies proves that there's no room left in the market for smaller companies, which in turn means no room for innovation. The game is over.

The same type of chatter is heard on the PC side of the business. The big companies — the Compaqs and the IBMs — have become bigger, taking market share away from their smaller rivals and stunting innovation. Again, conventional wisdom claims that the game is over.

Conventional wisdom is dead wrong. The reason that it's way off the mark is that it's missing the fundamental truth of the computer business: things always change and this change happens very rapidly. In fact, this is the fastest changing business the world has ever seen. Every 18 months we have twice as much computer processing power available. This demands growth and innovation.

We all know that's true. Just last year, a 66-MHz 486/DX2-based PC was the fastest machine you could get your hands on. It was the high end of the PC market. By the end of this year, it will be the entry-level machine. The game's not over, but the rules of the game are changing once again.

Let's look at what's going on. A personal computer used to be primarily a processing machine; it was used to do word processing and number processing. That's changed. Today, a PC is also becoming a major communications tool. Electronic mail is part of our lives. LANs are part of our lives. Enterprise-wide WANs are growing at an amazing rate. Soon we will all be connected not only to our own companies, but to our suppliers and customers as well. Eventually we'll all be linked up to everyone else. This will open up lots of new opportunities because it will change — in fact, it *is* changing — the way we work.

'Groupware' products are networked ap-

plications designed to help people in business work together. But as you can see, this isn't just one category of software. We have group discussion packages, whiteboard software, video conferencing software, and document management, image management, meeting management, and workflow products.

In this blossoming software niche, there are hundreds of new products, many of which we've never looked at before. As far as the market is concerned, the list of categories (or types of groupware) hasn't yet been set, so it's anyone's guess who the winners are going to be. This means that there's a lot of opportunity for both large and small companies to grow. And it means there's going to be a lot of opportunity for the hardware, systems software, management tools, and peripherals that will make all of this work.

Go all the way to the other end of the computing spectrum and take a peek at the future of the home market. Before you know it, you're seeing home sales of PCs really growing because the personal computer is really becoming *personal* again. You're seeing new kinds of education and entertainment software. You're seeing people at home doing things with computers you've never seen before.

Look on the hardware side of things. If you think you don't need high-end processing power at home, then you haven't tried the new multimedia education and entertainment packages. Some of these programs make Pentium-class machines seem slow. As software gets even more sophisticated, we will undoubtedly find ourselves wanting a whole lot more processing power.

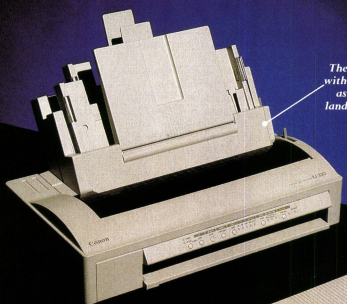
Then imagine what happens when homes become hooked up into a nationwide information network, and everybody at home has access to all kinds of information. No one knows for sure what customers will really want, or what kinds of niches are going to be available. This leads to more opportunity, more innovation.

Even in something that is supposedly as static as business software, where you might think that Microsoft, Lotus, and Novell have a lock — though I don't think that's necessarily true — we have a lot of new technology coming. OLE, OpenDoc, Taligent Frameworks, and the like are all designed to let developers create and

To page 54

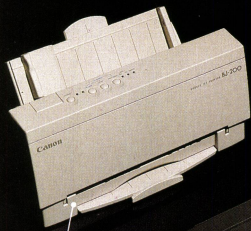
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TECHNOLOGY



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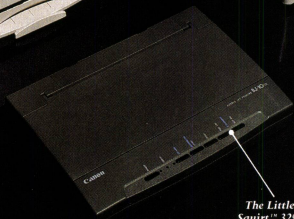
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Bill Machrone, from page 50

Cindy Crawford. Every time she appears in any publication, some devoted fan dutifully scans the image and loads it in. This particular server, which also has a lot of pornography, has access limits. You can wear out your welcome by downloading too many images. The operators warn that if you come back too frequently you will make their 'Top 50 Horny Geeks' list.

You can also see the leading edge of

communications technology. Internet Talk Radio, for example, is a downloadable sound file of weekly interviews with movers and shakers in government and industry. If you have the right equipment and a high-speed connection, you can see live television from MIT's Media Lab. Magazine-format Web servers are growing in popularity. You can catch up on all the latest music-industry gossip on MTV.COM, which is run by video jock Adam Curry.

You can download Doctor Fun, a daily cartoon in the same vein as The Far Side, from servers at the University of Chicago or the University of North Carolina. Michigan State University has an interactive weather map; you click on the desired region of the country to get a forecast for that area. The Internet is rife with such experimentation, and the World-Wide Web is at the forefront.

The easiest way to get onto the Web is to use an existing Internet connection to FTP (download) a copy of Mosaic to yourself through services such as Oz-Email (phone 008 805 874), APANA (PO Box 782, Mount Waverley, Victoria 3149), TMX (Phone (02) 550 4448), and Connect.COM (Phone (03) 2239). ▲

Michael Miller, from page 52

combine smaller software components. So we're starting to hear about the 'dis-integration' of software. We're now seeing applications like Visio Express, an inexpensive component that adds drawing tools and looks just like Microsoft Office. We will see many more such components, designed to work with Microsoft's, Lotus', and Novell's office suites. Lots of companies are working on add-ons and products designed to work with network platforms, such as Lotus Notes and Novell's AppWare.

Let's look around once more: today we have more processing power than ever before, and we're going to get more. We have more networking than ever before, and we're going to get a lot more. We have more software services than ever before, and we're going to get a whole lot more as we begin to use multitasking, multi-threaded, 32-bit operating systems. The new technology invites new innovation to exploit it.

With over 100 million PCs out there worldwide today, and that number growing tremendously every year, even a little product can become a big product fairly easily. I look at the technology that's coming and see possibilities for dozens of new applications and new companies. Across the whole spectrum, whether you talk about the networking market, the home market, or the business applications market, there's plenty of opportunities left for companies of all sizes.

That's good news for all of us who use computers. We've come a long way in the PC revolution, and it's far from over. We don't know where all of this is going to lead, no one can really imagine what the software of the future will look like. We want, we need, and I believe we'll get more innovation in both hardware and software in the years to come. Some may say the game is over, but I say it's really just the beginning. ▲

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src-1501	15"	.28	28-64	1280 x 1024 (NI)	85
src-1702	17"	.28	24-82	1600 x 1280 (NI)	120
src-2002	20"	.28	30-82	1600 x 1280 (NI)	120
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Readers' say

Not crippleware!

Please tell Jeremy Horey (Two Bits' Worth *APC* June 94, Page 45) that WinFax Lite works just fine — at least the way I use it. Just set it up as one of your Windows printers, prepare your fax using a Windows word processor (I use Word for Windows 6.0) and print it to the WinFax Lite 'printer'. Once Print Manager starts spooling the job, a WinFax Lite window pops up inviting you to enter the destination fax number or select one from the 'phonebook'. Simplicity itself!

David Brown
Castle Hill, NSW

Sorry, I can't resist this. I have been using my WinFax Lite to successfully send faxes (and receive a few) for nearly two years without any problems. I don't think it was the software that was crippled. I've not upgraded to WinFax Pro because Lite does all I want.

The real problem, of course, is that your comments then raise questions about the accuracy of other information in your magazine.

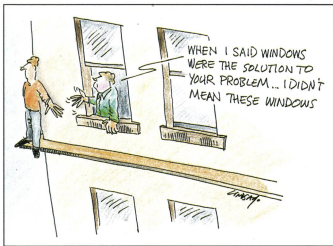
Ken Callan
Cardiff Heights, NSW

As the Australian distributor of Delrina software products, it was with some consternation that we read Jeremy Horey's 'Forum' column in *APC*, June 94.

It concerns us greatly that someone in Jeremy's position could produce in print such wild assertions about any product, without checking at least basic facts. That a reputable publication such as *APC* does not have some method of catching untrue statements before they reach the public eye is disturbing, especially from a legal viewpoint. With the level of influence that the media possesses, our refuting of Jeremy's assertions will do little to correct the totally unwarranted damage he has done to the reputation of WinFax.

We understand and welcome valid criticisms of Delrina's products. We use these criticisms to try and improve the software, so that as many users as possible are happy with their purchase. However, in this case, the criticism is invalid. To put it as simply as possible, Jeremy was wrong!

If he had taken the time to read a few more pages of the manual, or to speak to any one of the thousands of users of WinFax Lite in



Australia, he would not have written as he did. His ill-informed comments betray a spur-of-the-moment decision, made under pressure, in a foreign country in the middle of the night. As has often been said, things will always look better in the morning.

For Jeremy to say "You cannot send a proper fax from this 'Lite Version,'" is just not true, if he was using the normal WinFax Lite supplied worldwide. To fax out of any Windows application with Lite, the minimal steps are as follows:

1. Go into the Print Setup under the application and choose WinFax Lite as the printer.
2. Click on File-Print. A fax send dialogue box appears.
3. Enter a fax number and click on send.

It is that simple. Cover pages may be added to the fax, or sent on their own. WinFax Lite owners must have read Jeremy's column and scratched their heads, wondering what on earth he had actually tried.

Perhaps Delrina is guilty of making WinFax too simple? Jeremy could have been looking for a torturous procedure to send his fax, and when he could not find this, assumed that the software was incapable of this most basic function. If this is the case, he is simply illustrating why WinFax is so popular. There are lots of fax/modem manufacturers out there who demand this level of ease of use. This is why so many Australian modem manufacturers make WinFax Lite available with their modems — it is what users are demanding.

If the product was really 'crippleware' (an objectionable term in its own right), WinFax would not be the most popular **To page 58**

We welcome comments and suggestions. Send correspondence to APC Readers' Say, PO Box 37, Sydney 2001; or by email to 5653911

@MCIEmail.com. All correspondence becomes the property of APC and is subject to editing.

How to contact the editors

We welcome letters. However, we cannot look up stories from past issues, recommend products or diagnose problems with your PC by phone. Send your written questions, complaints, and compliments to APC, PO Box 37, Sydney 2001. Please include a daytime telephone number. Send electronic mail to 5653911 @MCIEmail.com.

If you are dissatisfied with a product advertised in APC, and cannot resolve the problem with the vendor, write (do not call) Richard Rodrigues, at the above address. Include copies of your correspondence with the vendor.

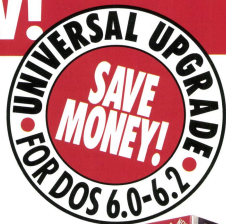
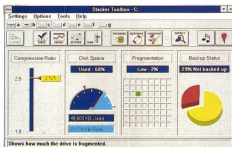
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fax software in both Australia and North America. It is very easy to get a bad reputation — it's extremely difficult to build up a good one!

**Linda Burns,
Sales manager
Bitware (distributor of
Delrina products)**

There are three broad types of article in APC. Reporting (which includes *Newsprint* and new product information), review (which includes our product reviews and features), and opinion. Editorials are opinion. And so too are our Two Bits Worth columns — hence the section's title.

The product analysis and reporting in APC are stock-filled with 'the facts' — product information and test results that have been checked and triple-checked. However, there are aspects of computing that can't always be adequately covered by product reviews or specification tables — the general subjective experience of computing, an understanding of the way the

computer industry works, or 'future gazing' to where technology is headed. This is why we include editorial introductions to the magazine and its features, and why Two Bits Worth is one of APC's most important and most popular sections.

Nothing we've recently published has generated anywhere near the reader response of Jeremy Horey's 'The frustrations of trying to use crippleware' Two Bits Worth column in the June issue. Happy WinFax Lite users wrote in by the dozen. Jeremy Horey had got it wrong, they said, and this cast doubt on the whole contents of APC.

Jeremy Horey doesn't often get it wrong. As founding Editor of PC User, then Editor of PC Week, and now Editor of The Australian's Computers section, he is possibly the most experienced and clear-sighted IT journalist in the country.

But let's look at what he actually said. Holed up in a Tokyo hotel room at 12.30am, facing

the rigours of the Japanese telecommunications system, and the urgent need to send a fax, he tried using WinFax Lite, which had come bundled with his modem. For whatever reason, the program didn't work. Based on his experience, he came to a conclusion. "As far as I can tell," he said, "WinFax Lite is a crippled version of WinFax Pro." His conclusion was wrong, but it was a reasonable conclusion, fairly expressed, and his reasoning was clearly explained. Above all, the principal principle of his column remains valid. Software that doesn't do what you expect when you really need it to is a pain in the butt.

We've used WinFax Lite extensively on APC. Mostly, it's a fine program, probably the best of the Lite packages currently being bundled. But there are times when it's let us down too, failing to establish dialog with a fax once connected, dropping the connection halfway through, or not properly terminating comms.

How many other users have been let down by software at a critical time? How many like to have to read the manual from start to stop to get a package working?

Jeremy Horey may have been wrong in labelling WinFax Lite crippleware, but as I believe Stuart Littlemore has been heard to say, there's no such thing as a wrong opinion. The particular conclusion on WinFax was wrong, and we acknowledge and apologise for this, but the overall thrust of the column was still spot on.

We hope that most readers appreciate the need for opinion columns, and see the differences between these and the 'factual' sections of our magazine, where accurate detail is our mantra. The circumstances that led to Jeremy Horey's belief that WinFax Lite was crippleware were key to his opinion piece, though, and we don't intend exercising censorship over such opinions. ▲

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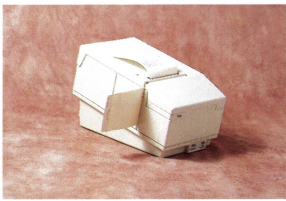
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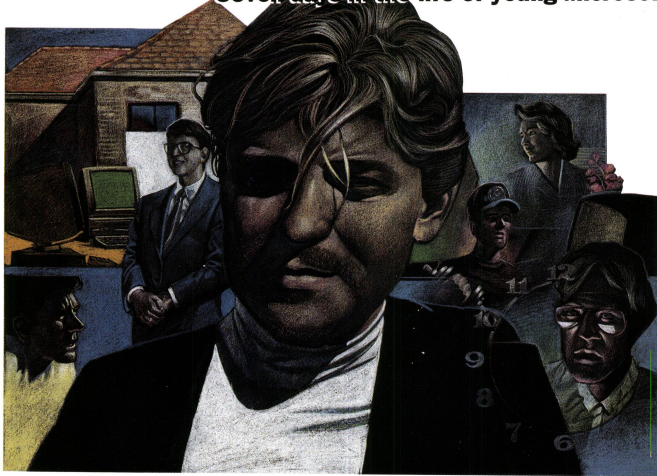
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Microserfs

Seven days in the life of young Microsoft



BY DOUGLAS COUPLAND

**Is the search for human identity a search
for the next great compelling application?**



FRIDAY

This morning, just after 11am, Michael locked himself in his office and he won't come out. Bill (Bill!) sent Michael this totally wicked flamemail from hell on the email system — and he just waited on a chunk of code Michael had

written. Using the Bloom County-car-toons-taped-on-the-door index, Michael is certainly the most sensitive coder in Building Seven — not the type to take criticism easily. Exactly why Bill would choose Michael of all people to wail on is confusing. We figured it must have been a random quality check to keep the troops in line. Bill's so smart.

Bill is wise.

Bill is kind.

Bill is benevolent

Bill, Be My Friend. . . Please! Actually, nobody on our floor has ever been flamed by Bill personally. The episode was tinged with glamour and we were somewhat jealous. I tried to tell Michael this, but he was crushed.

lump outside my office. His skin was pale like rising bread dough, and his Toppy's cut was dripping sweat, leaving little damp marks on the oyster-grey-with-plum highlights of the Microsoft carpeting. He handed me a printout of Bill's memo and then gallumphed into his office, where he's been burrowed ever since.

He won't answer his phone, respond to email, or open his door. On his doorknob he placed a 'Do Not Disturb' thingy stolen from the Boston Radisson during last year's Macworld Expo. Todd and I walked out onto the side lawn to try to peek in his window, but his Venetian blinds were closed and a gardener with a leaf blower chased us away with a spray of grass clippings.

They mow the lawn every 10 minutes at Microsoft. It looks like green Lego pads.

Finally, at about 2:30am, Todd and I got concerned about Michael's not eating, so we drove to the 24-hour Safeway in Bellevue. We went shopping for 'flat' foods to slip underneath Michael's door.

The Safeway was completely empty save for us and a few other Microsoft people just like us — hair-trigger geeks in pursuit of just the right snack. Because of all the rich nerds living around here, Redmond and Bellevue are very 'on-demand' neighborhoods. Nerds get what they want when they want it, and they go psycho if it's not immediately available. Nerds over-focus. I guess that's the problem. But it's precisely this ability to narrow-focus that makes them so good at code writing: one line at a time, one line in a strand of millions.

When we returned to Building Seven at 3am, there were still a few people grinding away. Our group is scheduled to ship product (RTM: Release to Manufacturing) in just 11 days (Top Secret: we'll never make it).

Michael's office lights were on, but once again, when we knocked, he wouldn't answer his door. We heard his keyboard chatter, so we figured he was still alive. The situation really begged a discussion of Turing logic — could we have discerned that the entity behind the door was indeed even human? We slid Kraft singles, Premium Plus crackers, Pop-Tarts, grape leather, and Freeze-Pops in to him.

Todd asked me, "Do you think any of this violates geek dietary laws?" Just then, Karla in the office across the hall screamed and then glared out at us from her doorway. Her eyes were all red and sore behind her round glasses. She said, "You guys are only encouraging him," like we were feeding a raccoon or something. I don't think Karla ever sleeps.



She harrumphed and slammed her door closed. Doors sure are important to nerds. Anyway, by this point Todd and I were both really tired. We drove back to the house to crash, each in our separate cars, through the Campus grounds — 22 buildings worth of nerd-cossetting fun — cloistered by 30.4m tall second growth timber, its streets quiet as the womb: the foundry of our culture's deepest dreams.

There was mist floating on the ground above the soccer fields outside the central buildings. I thought about the email and Bill and all of that, and I had this weird feeling — of how the presence of Bill floats about the Campus, semi-visible, at all times, kind of like the dead grandfather in the Family Circus cartoons. Bill is a moral force, a spectral force, a force that shapes, a force that molds. A force with thick, thick glasses.

I am daniel.u@microsoft.com. If my life was a game of Jeopardy! my seven dream categories would be:

- Tandy products
- Trash TV of the late 70s and early 80s
- The history of Apple
- Career anxieties
- Tabloids
- Plant life of the Pacific Northwest
- Jell-O 1-2-3.

I am a tester — a bug checker in Building Seven. I worked my way up the ladder from Product Support Services (PSS) where I spent six months in phone purgatory in 1991 helping little old ladies format their Christmas mailing lists on Microsoft Works.

Like most Microsoft employees, I consider myself too well adjusted to be working here, even though I am 26 and my universe consists of home, Microsoft, and Costco. I am originally from Bellingham, up just near the border, but my parents live in Palo Alto now. I live in a group house with five other Microsoft employees: Todd, Susan, Bug Barbecue, Michael, and Abe.

We call ourselves 'the Channel Three News Team'. I am single. I think partly this is because Microsoft is not conducive to relationships. Last year down at the Apple Worldwide Development Con-

ference in San Jose, I met a girl who works not too far away, at Hewlett-Packard on Interstate 90, but it never went anywhere. Sometimes I'll sort of get something going, but then work takes over my life and I bail out of all my commitments and things fizzle.

Lately I've been unable to sleep. That's why I've begun writing this journal late at night, to try to see the patterns in my life. From this I hope to establish what my problem is

— and then, hopefully, solve it. I'm trying to feel more well adjusted than I really am which is, I guess, the human condition. My life is lived day to day, one line of bug-free code at a time.

The house: growing up, I used to build split-level ranch-type homes out of Lego. This is pretty much the house I live in now, but its ambience is anything but sterilized Lego-clean. It was built about 20 years ago, maybe before Microsoft was even in the dream stage, and this part of Redmond had a lost, alpine, ski-cabin feel.

Instead of a green plastic pad with little plastic nubbies, our house sits on a thickly treed lot beside a park on a cul-de-sac at the top of a steep hill. It's only a seven-minute drive from Campus. There are two other Microsoft group houses just down the hill. Karla, actually, lives in the house three down from us across the street.

People end up living in group houses either by email or by word of mouth. Living in a group house is a little bit like admitting you're deficient in the having-a-life department, but at work you spend your entire life crunching code and testing for bugs, and what else are you supposed to do? Work, sleep, work, sleep, work, sleep. I know a few Microsoft employees who try to fake having a life — many a Redmond garage contains a never-used kayak collecting dust. You ask these people what they do in their spare time and they say, "Uh — kayaking. That's right. I kayak in my spare time." You can tell they're faking it.

I don't even do many sports anymore and my relationship with my body has gone all weird. I used to play soccer three times a week and now I feel like a boss in charge of an underachiever. I feel like my body is a station wagon in which I drive my brain around, like a suburban mother taking the kids to hockey practice.

The house is covered with dark cedar paneling. Out front there's a tiny patch of lawn covered in miniature yellow crop circles thanks to the dietary excesses of our neighbour's German shepherd, Mishka. Bug Barbecue keeps his weather experiments — funnels and litmus strips and so forth — nailed to the wall beside the front



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door. A flat of purple petunias long-expired from neglect — Susan's one attempt at prettification — depresses us every time we leave for work in the morning, resting as it does in the thin strip of soil between the driveway and Mishka's crop circles.

Abe, our in-house multimillionaire, used to have tinfoil all over his bedroom windows to keep out what few rays of sun penetrated the trees until we ragged on him so hard that he went out and bought a sheaf of black construction paper at the Pay 'n Save and taped it up instead. It looked like a drifter lived here. Todd's only contribution to the house's outer appearance is a collection of car-washing toys sometimes visible beside the garage door. The only evidence of my being in the house is my 1977 AMC Hornet Sportabout hatchback parked out front when I'm home. It's bright orange, it's rusty, and dammit, it's ugly.



Shipping hell continued again today. Grind, grind, grind. We'll never make it. Have I said that already? Why do we always underestimate our shipping schedules? I just don't understand. In at 9:30am; out at 11:30pm. Domino's for dinner. And three Diet Cokes.

I got bored a few times today and checked the WinQuote on my screen — that's the extension that gives continuous updates on Microsoft's NASDAQ price. It was Saturday, and there was never any change, but I kept forgetting. Habit. Maybe the Tokyo or Hong Kong exchanges might cause a fluctuation? Most staffers peek at WinQuote a few times a day. I mean, if you have 10,000 shares (and tons of staff members have way more) and the stock goes up a buck, you've just made 10 grand! But then, if it goes down two dollars, you've just lost 20 grand. It's a real psychic yo-yo. Last April Fool's Day, someone fluctuated the price up and down by \$50 and half the staff had coronaries.

Because I started out low on the food chain and worked my way up, I didn't get much stock offered to me the way that programmers and systems designers get stock firehosed onto them when they start. What stock I do own won't fully vest for another 2.5 years (stock takes 4.5 years to fully vest).

Susan's stock vests later this week, and she's going to have a vesting party. And then she's going to quit. Larger social forces are at work, threatening to dissolve our group house.

The stock closed up \$1.75 on Friday. Bill has 78,000,000 shares, so that means he's

now \$136.5 million richer. I have almost no stock, and this means I am a loser.

News update: Michael is now out of his office. It's as if he never had his geek episode. He slept there throughout the whole day (not unusual at Microsoft), using his *Jurassic Park* inflatable T-Rex toy as a pillow. When he woke up in the early evening, he thanked me for bringing him the Kraft products, and now he says he won't eat anything that's not entirely two-dimensional. "Ich bin ein Flatlander," he piped, as he cheerfully sifted through hardcopy of the bug-checked code he'd been chugging out. Karla made disgusted clicking noises with her tongue from her office. I think maybe she's in love with Michael.

More details about our group house — Our House of Wayward Mobility.

Because the house receives almost no sun, moss and algae tend to colonize what surfaces they can. There is a cherry tree crippled by a fungus. The rear veranda, built of untreated 2 by 4s, has quietly rotted away, and the sliding door in the kitchen has been braced shut with a hockey stick to prevent the unwary from straying into the suburban abyss.

The driveway contains six cars: Todd's cherry red Supra (his life, what little there is of it), my pumpkin Hornet, and four personality-free grey Microsoftmobiles — a Lexus, an Acura Legend, and two Tauri (nerd plural for Taurus). I bet if Bill drove a Shriner's go-cart to work, everybody else would, too.

Inside, each of us has a bedroom. Because of the MacDonald's-like turnover in the house, the public rooms — the living room, kitchen, dining room, and basement — are bleak, to say the least. The dorm-like atmosphere precludes heavy-duty interior design ideas. In the living room are two velveteen sofas that were too big and too ugly for some long-gone tenants to take with them. Littered about the Tiki green shag carpet are:

- Two Microsoft Works PC inflatable beach cushions
- One Mitsubishi 27-inch colour TV
- Various vitamin bottles
- Several weight-gaining system cartons (mine)
- 86 copies of *MacWeek* arranged in chronological order by Bug Barbecue, who will go berserk if you so much as move one issue out of date
- Six Microsoft Project 2.0 juggling bean bags
- Bone-shaped chew toys for when Mishka visits

- Two PowerBooks
- Three IKEA mugs encrusted with last month's blender drink sensation
- Two 12.5-pound dumbbells (Susan's)
- A Windows NT box
- Three baseball caps (two Mariners, one A's)
- Abe's *Battlestar Galactica* trading card album
- Todd's pile of books on how to change your life to win! (*Getting Past OK*, *7 Habits of Highly Effective People*). The kitchen is stocked with ramshackle 1970s avocado green appliances. You can almost hear the ghost of Emily Hartley yelling "Hi Bob!" every time you open the fridge door (a sea of magnets and 4 by 6-inch photos of last year's house parties).

Our mail is in little piles by the front door: bills, *Star Trek* junk mail, and the heap-o-catalogues next to the phone.

I think we'd order our lives via 1800 numbers if we could.

Mum phoned from Palo Alto. This is the time of year she calls a lot. She calls because she wants to speak about Jed, but none of us in the family are able. We kind of erased him.

I used to have a younger brother named Jed. He drowned in a boating accident in the Strait of Juan de Fuca when I was 14 and he was 12. A Labor Day statistic.

To this day, anything Labor Day-ish creeps me out: the smell of barbecuing salmon, life preservers, Interstate traffic reports from the local radio Traffic Copter, Monday holidays. But here's a secret: my email password is hellojed. So I think about him every day. He was way better with computers than I was. He was way nerdier than me.

As it turned out, Mum had good news today. Dad has a big meeting Monday with his company. Mum and Dad figure it's a promotion because Dad's IBM division has been doing so well (by IBM standards — it's not haemorrhaging money). She says she'll keep me posted.

Susan taped laser-printed notes on all of our bedroom doors reminding us about the vesting party this Thursday (*Vest Fest 93*) which was a subliminal hint to us to clean up the place. Most of us work in Building Seven; shipping hell has brought a severe breakdown in cleanup codes.

Susan is 26 and works in Mac Applications. If Susan were a Jeopardy! contestant, her dream board would be:

- 680X0 assembly language
- Cats



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- Early 80s haircut bands
- 'My secret affair with Rob in the Excel Group'
- Licence plate slogans of America
- Plot lines from *The Monkees*
- The death of IBM.

Susan's an IBM brat and hates that company with a passion. She credits it with ruining her youth by transferring her family eight times before she graduated from high school — and the punch line is that the company gave her father the boot last year during a wave of restructuring. So nothing too evil can happen to IBM in her eyes. Her graphic designer friend made up T-shirts saying "IBM: Weak as a Kitten, Dumb as a Sack of Hamsters." We all wear them. I gave one to Dad last Christmas but his reaction didn't score too high on the chuckle-o-meter. (I am not an IBM brat — Dad was teaching at the University of Western Washington until the siren of industry lured him to Palo Alto in 1985. It was very 80s.) Susan's a real coding machine. But her abilities are totally wasted reworking old code for something like the Norwegian Macintosh version of Word 5.8. Susan's work ethic best sums up the ethic of most of the people I've met who work at Microsoft. If I recall her philosophy from the conversation she had with her younger sister two weekends ago, it goes something like this: "It's never been, 'We're doing this for the good of society.' It's always been us taking an intellectual pride in putting out a good product — and making money. If putting a computer on every desktop and in every home didn't make money, we wouldn't do it." That sums up most of the Microsoft people I know.

Microsoft, like any office, is a status theme park. Here's a quick rundown:

- Profitable projects are galactically higher in status than loser (not quite as profitable) projects
- Microsoft at Work (Digital Office) is sexiest at the moment. Fortune 500 companies are drooling over DO because it'll allow them to downsize millions of employees. Basically, DO allows you to operate your fax, phone, copier — all of your office stuff — from your PC
- Cash cows like Word are profitable but not really considered cutting edge
- Working on-Campus is higher status than being relegated to one of the off-Campus Siberias
- Having 486-driven hardware (built to the hilt) in your office is higher status than having 386 drossware
- Having technical knowledge is way up there
- Being an architect is also way up there.
- Having Bill-o-centric contacts is way, way up there
- Shipping your product on time is maybe the coolest (insert wave of anxiety here). If you ship on time you

get a Ship-It award: a 30 by 38 by 2.5cm Lucite slab — but you have to pretend it's no big deal. Michael has a Ship-It award and we've tried various times to destroy it — blowtorching, throwing it off the verandah, dowsing it with acetone to dissolve it — nothing works. It's so permanent, it's frightening.

More roommate profiles: First, Abe. If Abe were a Jeopardy! contestant, his seven dream categories would be:

- Intel assembly language
- Bulk shopping
- C++
- Introversion
- "I love my aquarium"
- How to have millions of dollars and not let it affect your life in any way
- Unclean laundry.

Abe is sort of like the household Monopoly-game banker. He collects our monthly checks for the landlord, \$235 apiece. The man has millions and he rents! He's been at the group house since 1984, when he was hired fresh out of MIT. (The rest of us have been here, on average, about eight months apiece.) After 10 years of writing code, Abe so far shows no signs of getting a life. He seems happy to be reaching the age of 30 in just four months with nothing to his name but a variety of neat-o consumer electronics and boxes of Costco products purchased in rash moments of Costco-scale madness ("Ten thousand straws! Just think of it — only \$10 and I'll never need to buy straws ever again!") These products line the walls of his room, giving it the feel of an air-raid shelter.

Bonus detail: There are dried out patches of sneeze spray all over Abe's monitors. You'd think he could afford 24 bottles of Windex.

Next, Todd. Todd's seven Jeopardy! categories would be:

- Your body is your temple
- Baseball hats
- Meals made from combinations of Costco products
- Psychotically religious parents
- Frequent and empty sex
- SEGA Genesis gaming addiction
- The Supra.

Todd works as a tester with me. He's really young — 22 — the way Microsoft employees all used to be. His interest is entirely in girls, bug testing, his Supra, and his body, which he buffs religiously at the Pro Club gym and feeds with peanut butter quesadillas, bananas, and protein drinks.

Todd is historically empty. He neither knows nor cares about the past. He reads *Car and Driver* and fields three phone calls a week from his parents who believe that com-

puters are "the Devil's voice box", and who try to persuade him to return home to Port Angeles and speak with the youth pastor.

Todd's the most fun of all the house members because he is all impulse and no consideration. He's also the only roomie to have clean laundry consistently. In a crunch you can always borrow an unsoiled shirt from Todd.

Bug Barbecue's seven Jeopardy! categories would be:

- Bitterness
- Xerox PARC nostalgia
- Macintosh products
- More bitterness
- Psychotic loser friends
- Jazz
- Still more bitterness.

Bug Barbecue is the World's Most Bitter Man. He is (as his name implies) a tester with me at Building Seven. His have-a-life factor is pretty near zero. He has the smallest, darkest room in the house, in which he maintains two small shrines: one to his Sinclair ZX-81, his first computer, and the other to supermodel Elle MacPherson. Man, she'd freak if she saw the hundreds of little photos — the coins, the candles, the little notes.

Bug is 31, and he lets everyone know it. If we ever ask him so much as "Hey Bug — have you seen volume 7 of my *Inside Mac*?" he gives a sneer and replies, "You're obviously of the generation that never built their own motherboard or had to invent their own language." Hey, Bug — we love you, too.

Bug never gets offered stock by the company. When payday comes and the little white-stock option envelopes with red printing reading "Personal and Confidential" send up in all of our pigeonholes, Bug's is always, alas, empty. Maybe they're trying to get rid of him, but it's almost impossible to fire someone at Microsoft. It must drive the administration nuts. They hired 3100 people in 1992 alone, and you know not all of them were gems.

Oddly, Bug is fanatical in his devotion to Microsoft. It's as if the more they ignore him, the more rabidly he defends their honour. And if you cherish your own personal time, you will not get into a discussion with him over the famous Look-&-Feel lawsuit or any of the FTC or Department of Justice actions: "These litigious pricks piss me off. I wish they'd compete in the marketplace where it really counts instead of being little wusses and whining for government assistance to compete..." You've been warned.

Finally, Michael. Michael's seven Jeopardy! categories would be:

- FORTRAN



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- Hugo and Nebula Award winners
- Sir Lancelot.

Michael is probably the closest I'll ever come to knowing someone who lives in a mystical state. He lives to assemble elegant streams of code instructions. He's like Mozart to everyone else's Salieri — he enters people's offices where lines of code are written on the dry-erase whiteboards, and quietly optimises the code as he speaks to them, as though someone had written wrong instructions on how to get to the beach and he was merely setting them right so they wouldn't get lost.

He often uses low-tech solutions to high-tech problems: Popsicle sticks, rubber bands, and little strips of paper that turn on a bent coat hanger frame help him solve complex matrix problems. When he moved offices into his new window office (good code, good office), he had to put Post-it notes reading 'Not Art' on his devices so that the movers didn't stick them under the glass display cases out in the central atrium area.



SUNDAY

This morning before heading to the office I read an in-depth story about Burt and Lori's divorce in *People* magazine. Thus, 1,474,819 brain cells that could have been used toward a formula for world peace were obliterated. Are computer memory and human memory analogous? Michael would know.

Mid-morning, I mountain-biked over to Nintendo headquarters, across Interstate 520 from Microsoft.

Now, I've never been to the South African plant of, say, Sandoz Pharmaceuticals, but I bet it looks a lot like Nintendo headquarters — two-story industrial plex buildings sheathed with Deathstar black windows and landscape trees around the parking lot seemingly clicked into place with a mouse. It's nearly identical to Microsoft except Microsoft uses sea-foam green glass on its windows, and has big soccer fields should it ever really need to expand.

I hackey-sacked for a while with my friend, Marty, and some of his tester friends during their break. Sunday is a big day for the kids who staff the PSS phone lines there

because all of young America is out of school and using the product. It's really young at Nintendo. It's like the year 1311, where everyone over 35 is dead or maimed and out of sight and mind.

All of us got into this big discussion about what sort of software dogs would design if they could. Marty suggested territory-marking programs with piss simulators and lick interfaces. Antonella thought of Bone-Finder. Harold thought of a doghouse remodelling CAD system. All very cartographic/high sensory: lots of visuals.

Then, of course, the subject of catware came up. Antonella suggested a personal secretary program that tells the world, "No, I do not wish to be petted. Oh, and hold all my calls." My suggestion was for a program that sleeps all the time.

Anyway, it's a good thing we're human. We design business spreadsheets, paint programs, and word processing equipment. So that tells you where we're at as a species. What is the search for the next great compelling application but a search for the human identity? It was nice being at Nintendo where everybody's just a little bit younger and hipper than at Microsoft and actually takes part in the Seattle scene. Everyone at Microsoft seems, well, literally 31.2 years old, and it kind of shows.

There's this eerie, science-fiction lack of anyone who doesn't look exactly 31.2 on the Campus. It's oppressive. It seems like only last week the entire Campus went through Gap ribbed-T mania together — and now they're all shopping for the same 3bdr/2bth dove-grey condo in Kirkland.

Microserfs are locked by nature into

I'm 26 and I'm just not ready to turn 31.2 yet.

Actually, I've been thinking about this death denial business quite a bit lately. September always makes me think of Jed. It's as if there's this virtual Jed who might have been. Sometimes I see him when I'm driving by water. I see him standing on a log boom smiling and waving. I see him buckarooin a killer whale in the harbour off downtown while I'm stuck in traffic on the Alaskan Way viaduct. Or I see him walking just ahead of me around the Space Needle restaurant, always just around the curve.

I'd like to hope Jed is happy in the afterworld, but because I was raised without any beliefs, I have no pictures of an afterworld for myself. In the past I have tried to convince myself that there is no life after death, but I have found myself unable to do this, so I guess intuitively I feel there is something. But I just don't know how to be getting out what these pictures are.

Over the last few weeks I've been oh-so-casually asking the people I know about their own pictures of the afterworld. I can't simply come right out and ask directly because, as I say, you just don't discuss death at Microsoft.

The results were pretty dismal. Ten people asked, and not one single image. Not one single angel or one bright light or even one single, miserable barbecue briquette. Zero.

Todd was more concerned about who would show up at his funeral.

Bug Barbue told me all this depressing stuff, of how the constituent elements of his personality weren't around before he was born, so why should he worry about what happens to them afterward? Susan changed

the topic entirely. ("Hey, isn't Louis Gerstner hopeless?") Sometimes, in the employee kitchen, when I'm surrounded by the dairy cases full of Bill-supplied free beverages, I have to wonder if maybe Microsoft's corporate zest for recycling aluminium, plastic, and paper is perhaps a sublimation of the staff's hidden desire for immortality. Or maybe this whole Bill thing is actually the subconscious manufacture of God.

After Nintendo I mountain-biked around the Campus, delaying my venture into shipping hell. I saw a cluster of

Deadheads looking for magic mushrooms out on the west lawn beside the second-growth forest. Autumn is just around the corner.

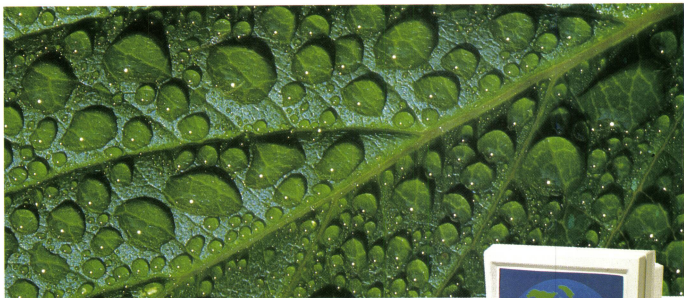
The trees around Campus are dropping their leaves. It's been strange weather this spring and summer. The newspaper says the trees are confused and they're shedding early this year.



doing 31.2-ish things: the first house, the first marriage, the "where-am-I-going" crisis, the out-goes-the-Miata/in-comes-the-minivan thing, and, of course, major death denial. A Microsoft VP died of cancer a few months ago, and it was like, you weren't allowed to mention it. Period. The three things you're not allowed to discuss at work: death, salaries, and your stock options.

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Todd was out on the main lawn training with the Microsoft intramural Frisbee team. I said hello. Everyone looked so young and healthy. I realised that Todd and his early-20s cohorts are the first Microsoft generation—the first group of people who have never known a world without an MS-DOS environment. Time ticks on.

They're also the first generation of Microsoft employees faced with reduced stock options and, for that matter, plateauing stock prices. I guess that makes them mere employees, just like at any other company. Bug Barbecue and I were wondering last week what's going to happen when this new crop of workers reaches its inevitable Seven Year Programmer's Burnout. At the end of it they won't have two million dollars to move to Hilo and start up a bait shop with, the way the Microsoft old-timers did. Not everyone can move into management.

Face it: you're always just a breath away from a job in telemarketing. Everybody I know at the company has an estimated time of departure and they're all within five years. It must have been so weird—living the way my Dad did—thinking your company was going to care for you forever.

A few minutes later I bumped into Karla walking across the west lawn. She walks really quickly and she's so small, like a little kid.

It was so odd for both of us, seeing each other outside the oyster walls and plum carpeting of the office. We stopped and sat on the lawn and talked for a while. We shared a feeling of conspiracy by not being inside helping with the shipping deadline.

I asked her if she was looking for 'shrooms with the Deadheads, but she said she was going nuts in her office, and she just had to be in the wild for a few minutes in the forest beside the Campus. I thought this was such an unusual aspect of her personality, I mean, because she's so mousy and indoorsy looking. It was good to see her and for once to not have her yelling at me to stop being a nuisance. We've worked maybe 10 offices apart for half a year, and we've never once really talked to each other.

I showed Karla some birch bark I'd peeled off a tree outside Building Nine and she showed me some scarlet sumac leaves she had found in the forest. I told her about the discussion Marty, Antonella, Harold,

and I had been having about dogs and cats over at Nintendo's staff picnic tables. She lay down on the ground and thought about this, so I lay down, too. The sun was hot and good. I could only see the sky and hear her words. She surprised me.

She said that we, as humans, bear the burden of having to be every animal in the world rolled into one. She said that we really have no identity of our own. She said, "What is human behaviour, except trying to prove that we're not animals?" She said, "I think we have strayed so far away from our animal origins that we are bent on creating a new, supra-animal identity." She said, "What are computers but the EveryAnimal-Machine?" I couldn't believe she was talking like this. She

was like an episode of *Star Trek* made flesh. It was as if I was falling into a deep, deep hole as I heard her voice speak to me. But then a bumblebee bumbled above us and it stole our attention the way flying things can.

She said, "Imagine being a bee and living in a great big hive. You would have no idea that tomorrow was going to be any different than today. You could return to that same hive a thousand years later and there would be just the same perception of tomorrow as never being any different. Humans are completely different. We assume tomorrow is another world." I asked her what she meant, and she said, "I mean that the animals live in another sense of time. They can never have a sense of history because they can never see the difference between today and tomorrow." I juggled some small rocks I found beside me. She said she didn't know I could juggle and I told her it was something I learned by osmosis in my last product group.

We got up and walked together back to Building Seven. I pushed my bike. We walked over the winding white cement path speckled with crow shit, past the fountains, and through the hemlocks and firs.

Things seem different between us now, as if we've somehow agreed to agree. And God, she's skinny! I think I'm going to bring her snacks to eat tomorrow while she works.

I hope this isn't like feeding a raccoon.

Worked until just past midnight and came back home. Had a shower. Three bowls of Corn Flakes and ESPN. My weekends are no different than my weekdays. One of these days I'm going to vanish up to someplace beautiful like Whidbey Island and just veg for two solid days.



MONDAY

Dad got fired! Didn't we see that one coming a mile away. This whole restructuring business.

Mum phoned around 11am and she spent only 10 minutes giving me the news. She had to get back to Dad, who was out on the back patio, in shock, looking out over Silicon Valley. She said we'll have to talk longer tomorrow. I got off the phone and my head was buzzing.

The results came in from the overnight stress tests—the tests we run to try to locate bugs in the code—and there were five breaks. Five! So I had my work cut out for me today. Nine days until shipping. Right.

I telephoned Susan over in Mac Applications. The news about Dad was too important for email, and we had lunch together in the big cafeteria in Building Sixteen that resembles the Food Fair at any half-way decent mall. Today was Mongolian sticky rice day. Susan was hardly surprised about IBM dumping Dad. She told me that when she was briefly on the OS/2 version 1.0 team, they sent her to the IBM branch in Boca Raton for two weeks. Apparently IBM was asking people over in the data entry department whether they wanted to train to be programmers.

"If they hadn't been doing boneheaded shit like that, your dad would still have a job." I've been thinking: I get way too many pieces of email, about 60 a day. This is a typical number at Microsoft. Email is like highways—if you have them, traffic follows.

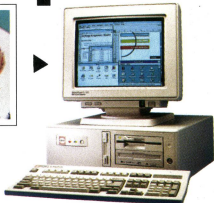
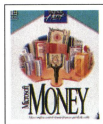
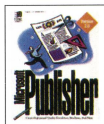
I'm an email addict. Everybody at Microsoft is an addict. The future of email usage is being pioneered right here. The cool thing with email is that when you send it, there's no possibility of connecting with the person on the other end. It's better than phone answering machines, because with them, the person on the other line might actually pick up the phone and you might have to talk.

Typically, everybody has about a 40 per cent immediate cull rate—those pieces of mail you can delete immediately because of a frivolous tag line. What you read of the remaining 60 per cent depends on how much of a life you have. The less of a life, the more mail you read. Abe has developed a 'rules-based' software program that anticipates his email preferences and sifts and culls accordingly. I guess that's sort of like Antonella's personal secretary program for cats.

After lunch, I drove down 156th Street to the Uwajima-Ya Japanese supermarket and bought Karla some seaweed and cucumber rolls. They also sell origami paper by the sheet there, so I threw in



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some cool coloured papers as an extra bonus.

When I got back to the office, I knocked on Karla's door and gave her the rolls and the paper. She seemed glad enough to see me (she didn't scowl) and genuinely surprised that I had brought her something.

She asked me to sit in her office. She has a big poster of a MIPS chip blueprint on her wall and some purple and pink flowers in a bud vase, just like Mary Tyler Moore. She said that it was kind of me to bring her a Japanese seaweed roll and everything, but at the moment she was in the middle of a pack of Skittles. Would I like some? And so we sat and ate Skittles. I told her about my Dad and she just listened. And then she told me that her own father operates a small fruit cannery in Oregon. She said that she learned about coding from canning lines — or rather, she developed a fascination for linear logic processes there — and she actually has a degree in manufacturing processes, not computer programming. And she folded one of those origami birds for me. Her IQ must be about 800.

IQs are one of the weird things about Microsoft — you only find the right-hand side of the bell curve on-Campus. There's nobody who's two-digit. Just one more reason it's such a sci-fi place to work.

Anyway, we started talking more about all of the fiftysomethings being dumped out of the economy by downsizing. No one knows what to do with these people, and it's so sad, because being 50 nowadays isn't like being 50 a hundred years ago when you'd probably be dead.

I told Karla about Bug Barbecue's philosophy: If you can't make yourself worthwhile to society, then that's your problem, not society's. Bug says people are personally responsible for keeping themselves relevant. Somehow, this doesn't seem quite right to me.

Karla speaks with such precision. It's so cool. She said that everyone worrying about rioting senior citizens is probably premature. She said that it's a characteristic of where we are right now on computer technology's ease-of-use curve that fiftysomethings are a bit slow at accepting technology.

"Our generation has all of the characteristics needed to be in the early-adopter group — time for school and no pesky unlearning to be done. But the barriers for user acceptance should be vanishing soon enough for fiftysomethings." This made me feel better for Dad.

Michael came by just then to ask about a subroutine and I realised it was time for me

to leave. Karla thanked me again for the food, and I was glad I had brought it along.

Caroline from the Word offices in Building Sixteen sent email regarding the word 'nerd'. She says the word only came into vogue around the late 70s when *Happy Days* was big on TV — eerily the same time that the PC was being popularised. She said prior to that, there was no everyday application for the word, "and now nerds run the world!" Abe said something interesting. He said that because everyone's so poor these days, the 90's will be a decade with no architectural legacy or style — everyone's too poor to put up new buildings. He said that code is the architecture of the 90s.

I walked by Michael's office around sundown, just before I left for home for a shower and a snack before coming back to stomp the bugs. He was playing a game on his monitor screen I'd never seen before. I asked him what it was and he told me it was something he had designed himself. It was a game about a beautiful kingdom on the edge of the world that saw time coming to an end.

However, the kingdom had found a way to trick God. It did this by converting its world into code — into bits of light and electricity that would keep pace with time as it raced away from them. And thus the kingdom would live forever, after time had come to an end.

Michael said the citizens of the kingdom were allowed to do this because they had made it to the end of history without ever having had the blood of war spill on their soil. He said it would have been an affront to all good souls who had worked for a better world over the millennia not to engineer a system for preserving finer

aerobic fun. Since when do grocery stores sell trampolines? What a screwy decade. I guess that's what it's like to be a millionaire.

The delivery guys dropped it off and around midnight we set it up in the front yard, over the crop circles, chaining one of the legs to the front railing. Bug Barbecue is already printing up a release he's going to make Abe have all the neighbours with kids sign, absolving Abe of any blame in the event of an accident.



TUESDAY

Woke up super early today, after only four hours sleep, to a watery light outside. High overcast clouds. Through my window I saw a plane fly over the house, headed into SeaTac, and it made me remember when 747s first came out. Boeing had a PR photo of a kid building a house of cards in the lounge up in the bubble. God, I wanted to be that kid. Then I got to wondering. Why am I bothering to get up? What is the essential idea that gets me out of bed and through the day? What is it that gets anybody out of bed? I figure I still want to be that kid building a house of cards in a 747.

I sandpapered the roof of my mouth with three bowls of Cap'n Crunch — had raw gobbets of mouth-beef dangling onto my tongue all day. It hurt like crazy, and it made me talk with a Cindy Brady lisp until late afternoon.

Spent two hours in the morning trapped in a room with the Pol Pots from Marketing. God, they never stop — like we don't have anything better to do eight days before shipping.

Even the bug testers. Like, we're supposed to see a box of free Dove bars and say, "Oh — it's okay then — please, please waste my time." I think everyone hates and dreads Marketings meetings because of how these meetings alter your personality. At meetings you have to explain what you've accomplished, so naturally you fluff up your work a bit, like pillows on a couch. You end up becoming this perky, gung-ho version of yourself that you know is just revolting.

I have noticed that everybody looks down upon the gung-ho type people at Microsoft, but nobody considers themselves gung-ho. They should just see themselves at these meetings, all fratty and chipper. Fortunately, gung-ho-ishness seems confined exclusively to marketing meetings. Otherwise I think the Campus is utterly casual.



thoughts after the millennium arrived and all ideologies died and people became animals once more.

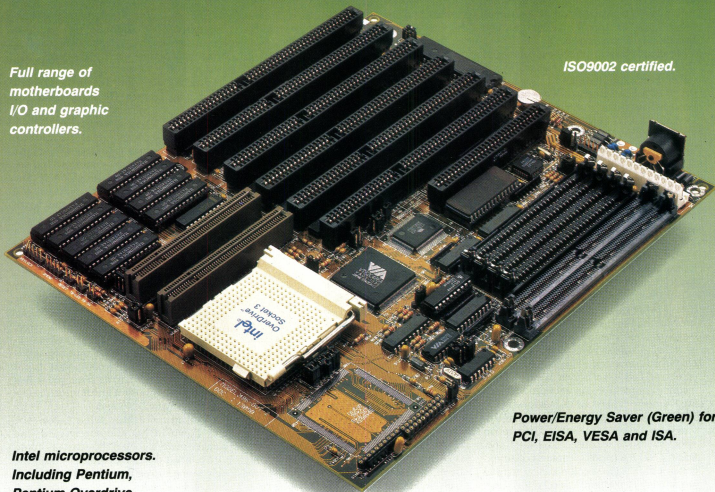
"Well," I said after he finished, "how about those Mariners!" Oh — Abe bought a trampoline. He went to Costco to stock up on Jif, and he ended up buying a trampoline — 14 by 14-foot, 196 square feet of bouncy

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Oh, and sometimes you get flame meetings. They're fun, too — when everyone flames everyone else.

Today's meeting was about niggly little shipping details and was numbingly dull. And then, near the end, a Motorola pager owned by Kent, one of the Marketing guys, went off on top of the table. It buzzed like a hornet and shimmied and twitched across the table in a dance of death. It was mesmerising, like watching a tarantula scamper across the table. It killed all conversation dead. Killed it right on the spot.

My smiling-muscles hurt as a result of the meeting. On top of my Cap'n Crunch mouth. A bad mouth day.

I called Mum right after the meeting and Dad answered the phone. I heard *Oprab* on in the background, and I didn't think that was a good omen. He sounded upbeat, but isn't that a part of the process? Denial? I asked him if he was watching *Oprab* and he said he had only come into the house for a snack.

Mum came on the phone on the extension, and once Dad was off the line, she confided that he barely slept the night before, and when he did, he made haunted moaning noises. And then this morning he dressed as though headed to the office, and sat watching TV, being eerily chipper, refusing to talk about what his plans were. Then he went out into the garage to work on his model train world.

I learned a new word today: trephination — drilling a hole in the skull to relieve pressure on the brain.

Karla came into my office this morning — a first — just as I was logging onto my email for the morning. She was holding a big cardboard box full of acrylic Windows coffee mugs from the company store in Building Fourteen. "Guess what everyone in the Karla universe is getting for Christmas this year?" she asked cheerfully. "They're on sale." I was a pause. "You want one, Dan?" I said that I drink too much coffee and colas, and that I'm a colon cancer statistic just waiting to happen. I said I'd love one. She handed it to me and there was a pause as she looked around my office: an NEC MultiSync monitor; a Compaq workhorse monitor; a framed Jazz poster; a "Mac Hugger" bumper sticker on my ceiling and my black-and-white photo shrine to Microsoft VP Steve Ballmer. "The shrine started as a joke," I said, "but it's sort of taking on a life of its own now. It's getting scary. Shall we worship?" It was then that she asked me, in a lowered tone, "Who's Jed?" She had seen me type in my password — like HAL from 2001.

And so I closed the door and told her about Jed, and you know, I was glad I was able to tell someone at last.

Mid-afternoon, Bug, Todd, Michael, and I grabbed some road-Snaples in the

kitchen and headed over to pick up some manuals at the library, out behind the Administration building. It was more of a fresh-air jaunt than anything else.

It was raining quite heavily, but Bug pulled his usual stunt. He made us all walk through the Campus' forest undergrowth instead of simply taking the pleasant winding path that meanders through the Campus trees — the Microsoft path that speaks of Wookies and Smurfs amid the salal, ornamental plums, rhododendrons, Japanese maple, arbutus, huckleberry, hemlock, cedars, and firs.

Bug believes that Bill sits at his window in the Admin Building and watches how staffers walk across the Campus. Bug believes that Bill keeps note of who avoid the paths and uses the fastest routes to get from A to B, and that Bill rewards these devil-may-care trailblazers with promotions and stock, in the belief that their code will be just as innovative and dashing.

We all ended up soaking wet, with Oregon Grape stains on our Dockers by the time we got to the library, and on the way back we read the Riot Act and said that Bug had to stop geeking out and learn to enculturate, and that for his own good he should take the path — and he agreed. But we could see that it was killing Bug — literally killing him — to have to walk along the path past where Bill's office is supposed to be.

Todd toyed with Bug and got him going on the subject of Xerox PARC, thus getting Bug all bitter and foaming. Bug is still in a sort of perpetual grief that Xerox PARC dropped the football on so many projects.

And then Michael, who had been silent up to now, said "Hey — if you cut over this berm, it's a little faster," and he cut off the path, and Bug's eyes just about popped out of his head, and Michael found a not bad shortcut. Right outside the Admin Building.

I realise I haven't seen a movie in six months. I think the last one was *Curly Sue* on the flight to Macworld Expo, and that hardly counted. I really need a life, bad.

It turns out Abe has entrepreneurial aspirations. We had dinner in the downstairs cafeteria together (Indonesian Bamay with frozen yogurt and double espresso). He's thinking of quitting and becoming a pixilation broker — going around to museums and buying the right to digitise their paintings. It's a very 'Rich Microsoft' thing to do. Microsoft's millionaires are the first generation of North American nerd wealth.

Once Microsoft's ships come in, they

travel all over: Scotland and Patagonia and Thailand... Condi *Nast Traveler*-ish places. They buy Shaker furniture, Saabs, koi, Pilchuk glass, native art, and 401Ks to the max. The ultrariches build fantasy homes on the Samamish Plateau loaded with electronic toys.

Its all low-key spending, mostly, and fresh and Sun. Nobody's buying crypts, I notice — though when the time comes that they do, said crypts will no doubt be emerald and purple coloured, and lined with Velcro and Gore-Tex.

Abe, like most people here, is a fiscal Republican, but otherwise, pretty empty-file in the ideology department. Vesting turns most people into fiscal Republicans, I've noticed.

The day went quickly. The rain is back again, which is nice. The summer was too hot and too dry for a Washington boy like me.

I am going to bring in some Japanese UFO-brand yaki soba tomorrow and see if Karla is into lunch. She needs carbs. Skittles and aspartame is no diet for a coder.

Well, actually, it is. A thought: sometimes the clouds and sunlight will form in a way you've never seen them do before, and your city will feel as if it's another city altogether. On the Campus today at sunset, people were stopping on the grass watching the sun turn stove-fila-

ment orange through the rain clouds. It's just something I noticed. It made me realise that the sun is really built of fire. It made me feel like an animal, not a human.

Worked until 1:30am. When I got in, Abe was down in his microbrewery in the garage, pattering amid the stacks of furniture handed down by parents — stuff too ugly to meet even the minimal taste standards of the upstairs rooms, the piles of golf clubs, the mountain bikes, and a line of suitcases, perched like greyhounds awaiting the word GO! Bug was locked behind his door, but by the smell I could tell he was eating a microwaved Dinty Moore product.

Susan was in the living room asleep in front of a taped *Seinfeld* episode.

Todd was obsessively folding his shirts in his room.

Michael was rereading *The Chronicles of Narnia* for the 87th time.

A nice average night.

I went into my room, which, like all six of the bedrooms here, is filled up almost completely with a bed, with walls lined with IKEA 'Billy' bookshelves and stereo equipment, jazz posters and Sierra Club calendars. On my desk sits a Sudafed box and a pile of



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stones from a beach in Oregon. My PC is hooked up by modem to the Campus.

Had a Tab (a Bill favourite) and some microwave popcorn and did some unfinished work.

WEDNESDAY

Well, it would seem that Bug Barbecue's theory might be correct after all. Michael got invited to lunch today with (oh God, I can barely input the letters) B-B-B-B-B-L-L-L! The news travelled around Building Seven like lightning just around 11:30. Needless to say, we tumbled into Bugs' office like puppies within seconds of getting word, tripping over his piles of soldering guns, wires, R-Kive boxes, and empty CD jewel boxes. Of course, he went mad with grief. We totally needed him: "You know, Bug, the deciding factor must have been Michael's walking over that berm and making that incredible short cut. I tell you, Bill saw Michael make that call of genius and now I bet he's going to give Michael his own product group. You shouldn't have listened to us, man. We're losers. We're going nowhere. Now, Michael — he's a winner."

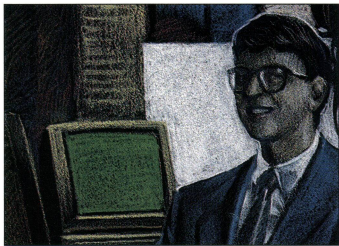
Actually, the invitation probably had more to do with the code Michael wrote during the bunkering last Friday, but we didn't tell Bug this. During the two hours Michael was away, time ticked by slowly. The curiosity was unbearable and we were all giddy and restless. We emerged from our offices into corridors of caged whimsy, amid our Far Side cartoons taped to windows, Pepsi-can sculptures taped to the walls, and inflatable sharks hanging from the ceiling, all lit by full-spectrum, complexion-flattering lighting.

We lapsed into one of our weekly-ish communal stress-relieving frenzies — we swiped sheets of bubble-pak from the supply rooms and rolled over them with our office chairs, popping hundreds of plastic zits at a go. We punished plastic troll dolls with 5-irons, blasting them down the hallway, putting yet more divots in the particle board walls and the ceiling panels. We drank Tabs and idly slagged interactive CD technology (Todd: "I used the Philips CD1 system — it's like trying to read a coffee table book with all of the pages glued together.") Finally Michael came back and walked past everybody, oblivious to the sensation of his presence, and entered his office. I walked over to his door.

"Hi Michael." Pause. "Soooooo?" "Hello,

Daniel. I have to fly to Cupertino tonight. Some kind of Macintosh assignment they're putting me on." "What was, well — he — like?" "Oh, you know. . . efficient. People forget that he is medically, biologically, a genius. Not one um or ah from his mouth all lunch; no wasted brain energy. Truly an inspiration for us all. I told him about my Flatlander flat-foods-only concept, and we then got into a discussion of beverages, which, as you know, tend to be consumed with straw in a linear, one-dimensional (and hence not two-dimensional) mode. Beverages are a real problem to my new Flatlander dining lifestyle, Daniel, let me tell you."

"But then Bill. . ." (first name basis) ". . . pointed out that one-dimensionality is perfectly allowable within a two-dimensional universe. So obvious, yet I hadn't seen it! Good thing he's in charge. Oh — Daniel, can I borrow your suitcase? Mine has all my old Habitrail gerbil mazes in it, and I don't want to take them out and then have to repack them all when I return." "Sure Michael." "Thanks." He booted up his computer. "I guess I'd better prepare for the trip. Where did I store that file — you'd think Lucy Ricardo handled my information for me. Well, Daniel — we'll talk later on?" He looked for something underneath a cardboard box containing a 60s Milton Bradley game of Memory.



He then looked up at me, gave me an "I want to return to the controllable and non-threatening world inside my computer" stare. You have to respect this, so the rest of the crew and I left him inside his office, clicking away on his board, knowing that Michael, like a young beauty swept out of a small Nebraska town by some Hollywood Daddy-O, was soon to leave our midst for happier ails, never to return.

Mum called. Dad stuff — after not sleeping all night again, he dressed for work and then went into the garage once more to work on his model trains. When she tries to

talk about the firing, he gets all jolly and brushes it away, saying the future's just going to be fine. But he has no details. No pictures of what comes next.

Dad called. From his den. He wanted to know what the employment situation was like at Microsoft for someone like him. I couldn't believe it. So now I'm worried about it. He should know better. I guess it's shock.

I told him to relax, to not even try to think about doing anything for at least a few more days until the shock wears off. He acted all hurt, as if I was trying to get rid of him. He wasn't himself. I tried to tell him what Karla had told me, about fiftysomethings now just entering the case-of-use curve with new technologies, but he wouldn't listen. It ended on a bad note, and this bugged me, but I didn't know one other practical thing I could say.

I went to Uwajima-Ya and bought some UFO yaki soba noodles, the ones that steep in hot water in their own little plastic bowl. Amid all the lunch-with-Bill foofarah, Karla and me managed to eat together. I asked her what her seven Jeopardy! dream categories would be — I told her about everyone else's, and she considered these as she twisted the yaki soba noodles in the little plastic dish, and then she said "They would have to be:

- Orchards
- Labrador dogs
- The history of phone pranks
- Crime novels
- Intel chips
- Things HAL says in 2001 and
- "My parents are psychopaths."

She then said to me, "Dan, I have a question about identity for you. Here it is: what is the one thing more than any other thing that makes one person different from any other person?" I got all ready to blurt out an answer but then nothing came out of my mouth.

The question seemed so obvious to start with, but when I thought about it, I realised how difficult it is — and sort of depressing, because there's real-

ly not very much that distinguishes anyone from anyone else. I mean, what makes one mallard duck different from any other mallard duck? What makes one grizzly bear different from any other grizzly bear? Identity is so tenuous — based on so little, when you really consider it. "Their personality?" I lamely replied. "Their, uh, soul?" "Maybe. I think I'm beginning to believe the soul theory, myself. Last June I went to my 10-year high school reunion. Everyone's body had certainly aged over the decade, but everyone's essence was essentially the same as it had been when we were all in kinder-

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garden. Their spirits were the same, I guess. Dana McCulley was still a phony; Norman Tillich was still a jock; Eileen Kelso was still shockingly naïve. Their bodies may have looked different, but they were absolutely the same person underneath. I decided that night that people really do have spirits. It's a silly thing to believe. I mean, silly for a logical person like me." As reality returned in mid-afternoon, my boss, Shaw, came in for a hand-holding session. Shaw is a set-for-lifer. If you had to kill off all of the program managers, one by one, he would be the last to go — he has 14 direct reports (serfs) underneath him.

Shaw really wanted me to have a juicy problem so he could help me deal with it, but the only problem I could think of was how we're never going to make our shipping deadline in seven days, and with Michael gone, that's just more work for all of us. But this problem wasn't juicy enough for him, so he went off in search of a more exotically troubled worker.

Shaw is fortysomething, one of maybe 12 fortysomethings on the Campus. One grudgingly has to respect someone who's fortysomething and still in computers — there's a core techiness there that must be respected. Shaw still remembers the Flintstones era of computers, with punch cards and little birds inside the machines that squawked, "It's a living." My only problem with Shaw is that he became a manager and stopped coding. Being a manager is all hand-holding and paperwork — not creative at all. Respect is based on how much of a techie you are and how much coding you do. Managers either code or don't code, and it seems there are a lot more noncoding managers these days. Shades of IBM.

Shaw actually gave me an okay review in the semiannual performance review last month, so I have no personal beef against him. And to be honest, this is still not a hierarchical office: the person with the most information pertinent to any decision is the one who makes that decision. But I'm still cannon fodder when the crunch comes.

Shaw is also a Baby Boomer, and he and his ilk are responsible for (let me rant a second) this thing called "The Unitaape" — an endless loop of elevator jazz Microsoft plays at absolutely every company function. It's so irritating and it screams a certain, "We're not like our parents, we're flouting convention" blandness. One of these days it's going to turn the entire under-30 component of the company into a mob of deranged postal workers who rampage through the Administration Building with scissors and Bic lighters.

Checked the WinQuote: the stock was

down 85 cents over the day. That means Bill lost \$70 million today, whereas I lost nothing. But guess who'll sleep better? We slaved until 1am and I gave Karla and Todd rides home, first making a quick run to Safeway for treats. At the cash register, while paying for our Sour Strings and nectarines, we got into the usual nerd discussion over the future of computing.

Karla said, "You cannot de-invent the wheel, or radios or, for that matter, computers. Long after we're dead, computers will continue to be developed and sooner or later — it is not a matter of if, but when — an 'Entity' is going to be created that has its own intelligence. Will this occur 10 years from now? A thousand years from now? Whenever. The Entity cannot be stopped. It will happen. It cannot be de-invented."

"The critical question is, Will this entity be something other than human? The artificial intelligence community admits it has failed to produce intelligence by trying to duplicate human logic processes. AI-ers are hoping to create life-mimicking programs that breed with each other, simulating millions of years of evolution by cross-breeding these programs together, ultimately creating intelligence — an Entity. But probably not a human entity modelled on human intelligence." I said, "Well, Karla, we're only human — we can only know our own minds — how can we possibly know any other type of mind? What else could the Entity be? It will have sprung from our own

though there's a moral force holding the reins of technological progress. Maybe he does know. But then maybe Bill simply provides a focus for the company when no other focus can be found. I mean, if it weren't for the cult of Bill, this place would be deadsville — like a great big office supply company. Which is sort of what it is. I mean, if you really think about it.



THURSDAY

Woke up at 8:30 and had breakfast in the cafeteria — no crunchy cereals for the next week, thank you.

Over oatmeal, Bug and me were looking at some of the foreign employees — from France, or something — who were smoking outside in the cold and rain. Only the foreign employees smoke here — and always in sad little groups. Smoking's not allowed inside anywhere. You'd think they'd get the message.

We decided that the French could never write user-friendly software because they're so rude — they'd invent a little icon for a headwater that once clicked, made you wait 45 minutes for your file. It's no surprise that user-friendliness is a concept developed on the West Coast. The guy who invented the Smiley face is running for mayor of Seattle — for real. It was in the news.

Mum phoned the minute I entered my office. She visited the garage this morning — a hot, dry Palo Alto morning, with white sunlight screaming in through the cracks around the garage door — and there was Dad again in his blue IBM business suit and tie, standing in the centre of his U-shaped, waist-high transcape with just one dim light shining from the ceiling above, pushing his buttons and making the trains shunt and run and speed through mountains and over bridges.

Mum decided that enough was enough, that Dad really needed somebody to talk with — someone to listen to him. She pulled up one of the old Suzy Wong bamboo cocktail bar stools left over from the basement renovation, put aside her usual lack of enthusiasm for his model trains, and talked to Dad about them, like it was show-and-tell time.

"The model train set-up has expanded since you were here last, Danny," she told me. "There's a complete small town now, and the mountains are steeper and he's put more of those little green foam trees on them. It's like Perfectville, the town where everybody's supposed to grow up. There's



brains — the initial algorithms, at least. There's nothing else we could be duplicating except the human mind." Todd said that the Entity is what freaks out his ultrareligious parents. He said they're most frightened of the day when people allow machines to have initiative — the day we allow machines to set their own agendas.

"Oh God, I'm trapped in a 1940s B-movie," said Karla.

Afterward, once I was back in my room by myself, I got to mulling over our discussion. Perhaps the Entity is what people without any visions of an afterworld secretly yearn to build — an intelligence that will supply them with specific details — supply pictures.

Maybe we like to believe that Bill knows what the Entity will be. It makes us feel as



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a church now — and a supermarket and boxcars — he even has little drifters living inside the boxcars. And there's — " There was a pause.

"And what, Mum?" Still more silence.

"And — oh, Danny — " This was not easy for her to say. I said, "And what, Mum?" "Danny, there is a small white house on the top of the hill overlooking the town — apart from the rest of the landscape. So amid my other questions I asked him, "Oh, and what's that house there?" and he said to me, without breaking his pace, "That's where Jed lives!" We were both quiet. Mum sighed.

"How about I come down to Palo Alto tomorrow?" I said. "There's nothing pressing here. Lord knows I have enough time owing to me." More silence. "Could you, honey?" I said "Yes." "I think that would be good." I could hear their fridge humming down in California.

"There's so many consultants on the market right now," Mum said. "People always say that if you get downsized you can become a consultant, but your father is 53, Dan. He's not young and he's never been competitive by nature. I mean, he was at IBM. We really just don't know what is going to happen." I called a travel agent in Bellevue and VISA'd a ticket to San Jose. I skipped email and tried to focus on the overnight stress tests, but my mind was blanking. Two code breaks overnight — so close to shipping and we're still getting breaks! I tried roaming the corridors for diversion, but somehow the world was different. Michael was in Cupertino (with my luggage); Abe wasn't in his office — he'd bailed out for the day and gone sailing in Puget Sound with some Richie Rich friends; Bug had gone into a crazy mood since breakfast and had a "Get Lost" Post-it note on his door, and Susan was at home for the day preparing for the Vest Fest. And the one other person I wanted to see, Karla, wasn't in her office.

I was leaning over the rails of the central atrium, looking at the cd displays in the cases and the spent nerds flopped out on the couches below, when Shaw walked by. I had to be all hearty and rah-rah and perky about the shipping deadline.

Shaw said that Karla was away with Kent doing a marketing something-or-other, and the thought flashed through my

head that I wanted to kill Kent, which was irrational and not like me.

The day then degenerated into a "Thousand Dollar Day". That's what I call the kind of day where, even if you tell all the people you know, "I'll give you a crisp, new thousand-dollar bill if you just give me



a phone call and put me out of my misery", even still, nobody phones.

I only received 18 pieces of email, and most of them were bulk. And the WinQuote only went up and down by pennies. Nobody got rich; nobody got poor.

The rain broke around 3pm and I walked around the Campus feeling miserable.



I looked at all the cars parked in the lot and got exhausted just thinking about all the energy that must have gone into these people choosing just the right car. And I also noticed something Twilight-Zoney about all the cars on Campus: None of them have bumper stickers, as though everyone is censoring themselves. I guess this indicates a fear of something.

All these little fears: fear of not producing enough; fear of not finding a little white-with-red-printing stock option envelope in the pigeonhole; fear of losing the sensation of actually making something any more; fear about the slow erosion of perks within the company; fear that the growth years will never return again; fear that the bottom line is the only thing that really drives the process; fear of disposability — God, listen to me. What a downer. But sometimes I think it would be so much easier to be jerking espressos in Lynnwood, leaving the Tupperware-sealed, Biosphere 2-like atmosphere of Microsoft behind me.

And this got me thinking: I looked around and noticed that if you took all of the living things on the Microsoft Campus, separated them into piles and analysed the biomass, it would come out to:

- 38 per cent Kentucky bluegrass
- 19 per cent human beings
- .003 per cent Bill
- 8 per cent Douglas and balsam fir
- 7 per cent Western red cedar
- 5 per cent hemlock
- 23 per cent other: crows, birch, insects, worms, microbes, nerd aquarium fish, decorator plants in the lobbies...

Went home early at 5:30 and nobody was there. Susan had two card tables unfolded in the otherwise empty dining room area, awaiting their snacks. Abe had loaned Susan his sacred Dolby THX sound system for the party plus his two Adirondack chairs made from old skis.

The place still looked a bit bare.

It was like The Day Without People.

Around dark, things started hopping. Abe returned from sailing and cranked up old Human League tunes, to which he sang along from the shower. Susan returned with bags of food from the caterers that I helped her carry in and set up: pasta putanesca, Thai noodles, calzones, Cheetos, and gherkins. Bug and some of his bitter, nut-case friends arrived with a wide selection of beer, and they were in good moods, sitting around playing peanut gallery to *Hard Copy* and *A Current Affair*, being amusing and eating half of Susan's party food while she was dressing.

By 8, other guests began arriving, bringing bottles of wine, and by 9, the house, which not two hours previously had been a pit of gloom, was brimming with good cheer and U2.

Around 9:30, Susan was talking with her friends, telling them that she'd vested just in the nick of time — "I've been switching from a right-lobe person to a left-lobe person over the past 18 months, and I couldn't have gone on coding much longer. Anyway, I think the era of vesting is coming to a close." The phone in my room rang just then. (We have nine lines into our house. Pacific Bell either loves us or hates us.) I excused myself to answer it.

It was Mum.

Apparently Dad had just flown up to Seattle from Palo Alto on impulse. She'd just gotten in from her library job and had found the note on the door. I asked what time his flight landed and she told me he was arriving at the airport as we spoke.

So I went and sat on the curb outside the

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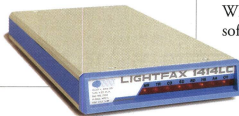
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house. It was a bit chilly and I was wearing my old basketball varsity coat. Karla walked up the hill from her place, said hello, and sat down beside me, carrying a 12-pack of beer that seemed enormously large for her small arms. From my body language she knew that everything wasn't okay, and she didn't ask me anything. I simply said, "My Dad's just flown up here — he's come ungled. I think he'll be arriving shortly." We sat and looked at the treetops and heard the wind rustle.

"I heard you were in a marketing discussion all day with Kent," I said to her.

"Yeah. It was unproductive. Pretty numbing. He's a creep."

"You know, I've been going through the whole day wanting to bludgeon him."

"Really?" She said. She looked at me sideways.

"Yeah. Really."

"Well now, that's not too logical, is it?"

"No." She then held my hand, and we sat there, together. We drank some of the beer she had brought and we said hello to Mishka the Dog, who cruised by to visit then went for a nap under the trampoline. And we watched the cars that pulled up to the house, one by one, waiting for the one car that would contain my father.

He arrived not too long afterward, in

a rental car, piss drunk (not sure how he swung that) looking tired and scared, with big bags under his eyes, and a bit deranged. He parked with a lurch right across the street from us. We sat and watched as he sucked in a breath and leaned back on the seat, his head slumped forward. He then turned his head toward us and through the open window said, a bit bashfully, "Hi." "Hi Dad." He looked back down at his lap.

"Dad, this is Karla," I said, still seated.

He looked at us again. "Hello Karla." "Hi." We sat on our opposite sides of the road. Behind us, the house had become a thumping shadowbox of festivity.

Dad didn't look up from his lap, so Karla and I stood up and walked over to him, and as we did, we saw that Dad was clutching something tight in his lap, and as we approached, he clutched it tighter. It seemed as though he was afraid we might take away whatever it was, and as we neared, I realised he was holding Jed's

old football helmet, a little boy's helmet, in gold and green, the old school colours.

"Danny," he said to me, not to my face, but into the helmet which he polished with his old man's hands, "I still miss Jeddie. I can't get him out of my mind." "I miss Jed too, Daddy," I said. "I think about him every day." He held the helmet tighter to his chest.

"Come on, Daddy — let's get out of the car. Come on into the house. We can talk in there." "I can't pretend I don't think about him any more. I think it's killing me." "I feel the same way, too, Daddy. You know what? I feel as if he's alive still, and that he's always walking three steps ahead of me, just like a king." I opened the door and Karla and I both supported Dad on either side as he clutched

the helmet to his chest, and we walked into the house, his appearance generating little interest in the overall crowd. We went into Michael's room, where we placed him on the bed.

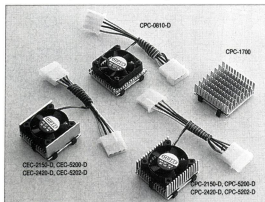
He was ranting a bit: "Funny how all those things you thought would never end turned out to be the first to vanish — IBM, the Reagans, Eastern bloc communism. As you get older, the bottom line becomes to survive as best you can." "We don't know about that yet, Daddy." I pulled off his shoes, and for some time Karla and I sat beside him on two office chairs. Michael's machines hummed around us and our only light source was a small bedside lamp. We sat and watched Dad filter in and out of consciousness.

He said to me, "You are my treasure, son. You are my first born. When the doctors removed their hands from your mother and lifted you up to the sky, it was as though they removed a trove of pearls and diamonds and rubies all covered in sticky blood." I said, "Daddy, don't talk like that. Get some rest. You'll find a job. I'll always support you. Don't feel bad. There'll be lots of stuff available. You'll see." "It's your world now," he said, his breathing deepening, as he turned to stare at the wall that thumped with music and shrieks of party-goers. "It's yours." And shortly after that, he fell asleep on the bed — on Michael's bed in Michael's room.

And before we left the room, we turned out the light and we took one last look at the warm black form of my father lying on the bed, lit only by the constellation of red, yellow, and green LEDs from Michael's sleeping, dreaming machines.



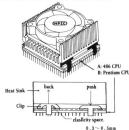
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4th Annual *Service*

BY GEOFF ISAAC

Over the last four years the APC Service and Reliability Survey has become increasingly important to both vendors — as a marketing tool — and purchasers — as a decision-making tool.

PC product vendors are constantly seeking new ways to differentiate their products, and any technological innovations are quickly matched by the competition. In the PC market, new battle lines are being drawn constantly. New generations of processor are becoming available to all vendors almost as soon as they are released, forcing vendors to seek new ways to make their products stand out.

Most notably in the market at present, vendors are in a race to set a new standard in environmentally-friendly 'green' PCs. Synergy between the individual's desire to help the environment and an organisational desire to reduce costs (through lower power bills) has seen the 'green' PC capture the market's imagination. Another example is the multimedia PC, and new DX4 and Pentium machines.

Although technological advances such as these are important they will only

& Reliability Report

APC's Service and Reliability Survey is the only large-scale survey in Australia to summarise the real-life experience of PC product users.

deliver a short-term premium to any vendor. Any significant breakthrough is quickly matched or exceeded by competitors, preventing any individual vendor from commanding a significant long-term premium.

As leading vendors have seen the PC product market move toward a commodity market the constant search for product differentiation has accelerated. After-sales support has been high on most major players' lists. Continuous effort is directed into reassuring the market that the product is backed by an after-sales support infrastructure that is second to none. The APC Service and Reliability Survey tests these claims.

On the purchaser side a plethora of information sources are available to assist with decision making. Vendors supply technical specifications, sales brochures and sales representatives to present their product in the best possible light. Independent publications, such as APC, offer benchmark comparisons and the opinions of independent experts, often in the form of reviews of specific products. Advertising bombards purchasers from every conceivable medium in an attempt to influence brand choice.

These survey results supplement traditional purchase decision-making tools as they give the prospective client an indication of the performance of the product on the job. In addition, the survey quantifies the standard of after-sales service provided by the vendor or his agents. The Service and Reliability report cuts through warranties and sales spiel to reveal the reality of everyday experience.

With the February edition of APC we distributed the Service and Reliability questionnaire. By the end of March we had received 4672 completed questionnaires representing a 12.8 per cent return rate on APC's then current audited paid circulation figure of 36,800. This level of response is exceptional; similar surveys on a wide variety of issues achieve response rates of between four and 10 per cent. This year's level of response is up over 25 per cent on the 3712 readers participating in last year's research on service and reliability.

Every reply is important as each response carries equal weight in determining overall industry averages. Only brands represented by at least 35 users

(increased from 30 last year due to space restrictions) are specifically covered. If your brand is not represented, your reply was not wasted; your experiences and opinions have been incorporated in the benchmarks against which all brands are measured.

On behalf of APC, I would like to sincerely thank all readers who participated in this project. Special thanks go to Optima Computer Technology for donating a state-of-the-art Pentium PC system as the incentive prize for this year's survey (see sidebar on page 84 for more details).

This year, we have summarised over 25,000 years worth of end-user experiences to bring you this report. This road test covers a wide variety of terrain. Large sections were conducted in the sanitised environment of an air-conditioned office, but a significant proportion of the test was conducted in less idyllic circumstances. Reports came in from all over the country on products being used in all sorts of situations, including extremes of temperature, dust and humidity.

We have analysed results across a variety of variables. Where our analysis has revealed significant deviations from

Methodology

Survey results are based on the opinions and experience of the 4672 readers who chose to respond to our fourth survey on Service and Projectable Reliability. Our sample is not a perfect random representative sample of the installed base and therefore results are not, necessarily applicable to all PC users.

For a product to be included in the results at least 35 users had to respond to our survey. For products where the sample is small (especially where it is less than 50 respondents) results should be treated with caution as they are based on a narrow band of user opinion.

Some results (marked *), for results to the question asking for how many days their product was unusable during the last year, have been adjusted to exclude anomalous replies and give a fairer representation of the majority of user experiences.

You will notice that some manufacturers do not receive a full set of scores. This is most evident in the monitor section where many respondents did not report a fault with their product. It was, therefore, deemed unfair to include a repair service score based on the experiences of only a handful of users.

People responding to our survey were asked to specify the make and model of their PC/printer/monitor. They were then asked a range of questions on their experiences with that particular product.

Respondents were asked to rate their PC/monitor/printer for the following attributes on a scale of one to five:

- Overall reliability;
- The ease with which they had contacted product support;
- Satisfaction with product support provided; and
- Satisfaction with repair services provided.

These scores were converted to a more familiar mark out of 10, with 10 representing an excellent score.

Respondents were asked three yes/no questions:

- Have you experienced any difficulty with the product since purchased?
 - Have you ever contacted product support?
 - Would you buy a product from the same manufacturer again?
- The replies to these questions are expressed as the percentage that said 'yes'.

No definition accompanied 'difficulty'. This was an unprompted

question asked of all respondents to gain an impression of user attitudes toward their equipment.

Results also include the mean of the numerical responses to two questions:

- Average time owned (in months)
- Average 'down' time (in days)

In addition, respondents were asked to specify if product support and repair services had been obtained directly from the vendor, through distributors or from a third party.

All averages are means calculated from the replies received from the users responding to our survey. Therefore averages include replies relating to many products not specified in the results.

Category averages are based on all replies received from users of products classified in that category. Hence Compaq's overall scores are compared with the average scores given by all respondents completing the microcomputer section of our survey, while Compaq 386DX scores are compared with averages calculated just from 386DX users responding to our Poll.

Scores were only calculated for product categories where we received more than 25 replies from users with experience of that product category.

The results asking respondents to rate their satisfaction with product support and repair services are based on a sub set of the respondents; only those who had experienced these services. The score shown is an average of all replies regardless of whether the service was provided directly by the vendor, distributor or third party. If the proportion of service provided by the vendor varied significantly from the average this is stated in the text. As our survey is not based on a perfect random sample strict statistical variance tests do not apply. When interpreting results please refer to the chart showing the number of replies received for each vendor. Where the response is low this should be considered when interpreting results.

As a rough guide any variance of 4 per cent (or 0.4 out of 10) or less can be ignored, this should be nearly doubled when the sample is near 35. A difference of over 10 per cent (or one out of 10) indicates a significant variance. As an indication we have shaded scores in three categories: those vendors who achieved a score of within ± 0.4 (or 4 per cent) of the average score have been classified 'average'; those vendors who scores were greater than 0.4 (or 4 per cent) above average have been classified 'better than average' and those vendors who achieved scores greater than 0.4 (or 4 per cent) below average have been classified 'worse than average'. This shading is meant as a guide only; please refer to sample size for each vendor when comparing results.

the vendor's average performance, this has been noted in the text. For example, if 486SX machines attracted from a particular vendor attracted significantly lower scores than machines based on other processors, this has been noted in the write up.

Research consistently demonstrates that APC readers are among the elite of Australia's PC users. They get their hands on new products all the time and are prime motivators in organisational purchase in-

itiation and brand specification. This research does not summarise the experiences of average end-users. Respondents are, typically, professionally involved with computers and the majority have years of personal experience from which to make comparisons and judgments.

Survey results are now regularly incorporated into the decision making equation. Companies such as Apple, Osborne, Wang, Philips and Unisys have capitalised on their strong performance and included

quotations in advertisements supported by huge budgets.

At the other end of the scale, The Service and Reliability Survey is regularly attacked by vendors who have failed to achieve impressive results. At least one mathematician has been commissioned to discredit the methodology and advertisers have cancelled their schedules with APC. However, we believe that APC's success, as Australia's biggest selling computer

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helps you contact people from around the world that are experts in their field. With "talk back" forums you can quickly locate the expert who can help you — without leaving your personal computer. A whole world of experts is at your fingertips from only 37 cents a minute. Here are a few of the hundreds of things you can do with CompuServe Pacific.

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Even beginners can compose, edit, send, and file messages the first time they are online to CompuServe Pacific. Our electronic mail puts business associates, friends and relatives in touch, anywhere in the world.

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If you want to learn more about your computer system, CompuServe Pacific is

at your service. Our hardware and software forums offer information and expertise on many different products.

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"...possibly the best source of live information and support for PC's available."

Jeremy White,
Australian Personal Computer.

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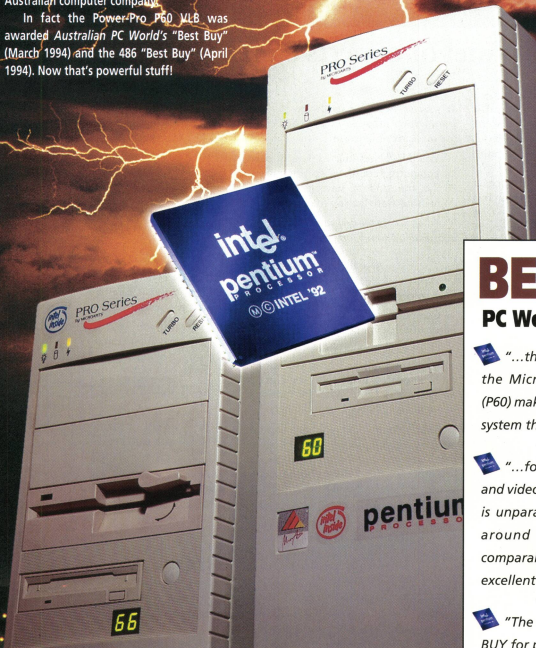
Introducing the ultimate dream machines. The "Lightning Fast" Microarts Power-Pro P60 PCI VESA, Power-Pro PCI & Power-Pro VLB Computers are built from the world's best brand components!

They're built to be the fastest computers in the country and they're built to be "Award Winners". And they are, with Microarts winning more "Best Buy" and "Editor's Choice" awards than any other Australian computer company.

In fact the Power-Pro P60 VLB was awarded *Australian PC World's* "Best Buy" (March 1994) and the 486 "Best Buy" (April 1994). Now that's powerful stuff!

POWER-PRO P60 PCI/VESA
POWER-PRO VLB
POWER-PRO PCI

by *MicroArts*



BEST BUY **PC World - March 1994**

“...the fastest PC we have tested, the Microarts Power-Pro Pentium (P60) makes a formidable Multimedia system through raw power alone...”

“...for expandability, application and video performance the Microarts is unparalleled, and all this is only around \$1000.00 more than a comparably configured 486DX2-66—excellent value for money...”

“The Microarts is awarded **BEST BUY** for power users!”

ONLY MICROARTS CAN HARNESS TRUE PENTIUM™ TECHNOLOGY!

PENTIUM™ PROCESSORS OR DX4-100MHZ: Introducing the latest in Processing Power!

Introducing the Intel Pentium™ processors and 486-100MHz DX4. They're Intel's latest *Rocketships!* What makes the Pentium processor different from previous processors? The amazing "Superscalar Technology" utilised in Pentium Processors allows two instructions to be carried out at one time, cycling at 60 or 66MHz and now 90MHz, resulting in over 100 Million instructions per second and more with the new 3.3V Low Power Pentium 90MHz processor.

The 486-100MHz DX4 screams, offering similar power to the Pentium processor in some software applications. Our cached DX4-100's will boot Windows in around 3 seconds! (Based on a cached boot).

And only Microarts can harness true Pentium and DX4 technology. We've proved it by winning *Australian PC World's* "Best Buy" awards with our Power-Pro P60 (with Pentium 60MHz processor) and 486 PCI.

VESA OR PCI BUS ARCHITECTURE:

Introducing the latest in PCI Technology!

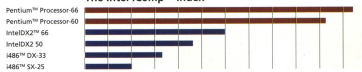
Choose your Bus! Microarts can offer VESA Local Bus or PCI Bus technology with our Power-Pro P60/66 PCI using the Pentium and PCI bus technology to take performance to incredible heights. The PCI bus can support a 132 Mb/Sec data transfer rate eliminating I/O bottlenecks.

Our Diamond Stealth 32 & Viper PCI Graphics Accelerators lead the world in "PCI Performance" and true "Heavyweight Graphics Punch". Also our PCI/Fast/SCSI-2 and PCI IDE Cache Controllers deliver the type of performance you're always wanted (and needed). The SCSI Interface ensures compatibility with CD Roms, Tape & Floptical Drives for the future, and our PCI IDE Cache Controller blows disk intensive applications out the door!

PROVEN BRAND NAME PERFORMANCE:

Microarts doesn't take any chances when it comes to harnessing Pentium technology – we only use proven brands from "World Leaders" such as Diamond and when combined with our R & D skills, you can be sure that our computers will always be faster, more featured and better value than the competition. We proved it by winning "Best Buy" awards with our Power-Pro P60 (PC World - March 94) and PCI 486 (PC World - April 94). Take a close look at what goes into our systems, and listen to what the critics say. And then call Microarts...who else?

The Intel iComp™ Index*



*The iComp Index is an Intel microprocessor "throughput" rating. It is a composite of selected performance measurements from SPECint, SPECfp and Whetstone. Source: iComp™. A simplified means of relative Intel Microprocessor Performance, Intel Corp., 1992.

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BRUNSWICK: (03) 380 4600 ADELAIDE: (08) 374 3310 FAX (08) 276 8877
PERTH: PHONE (09) 470 5028 FAX (09) 470 1785



Microarts 60/66MHz Power-Pro P60 PCI VESA

- Intel™ 60/66MHz Pentium Processor - 16k 1st Level Cache
- 512k Write Back Caching - Fastest Pentium Technology
- 3 or 4 x PCI Slots, 5 x ISA Slots
- 8MB Ram on Board Expandable to 128/192MB using 72 Pin Simms
- Panasonic 1.44 MB 3 1/2" Floppy Disk Drive
- 340MB SCSI-2 High Speed V/Coil Drive - 128k Cache - 13ms
- PCI Fast/SCSI-2 Disk Controller & Software Drivers
- SCSI Support for CD Roms, Floptical Drives, Tape Backups etc
- Diamond Stealth 32 PCI *Energy Star* V32P 2MB Ram Graphics Accelerator
- Fastest DRAM Based Accelerator in the World - New Features
- Diamond In Control Productivity Software for Windows
- Accelerated ACAD, OS2, Windows NT & SCO Unix Drivers
- Stealth 32 Supports up to 90Hz Fast Refresh Rates
- ViewSonic 15 *Energy Star* 15" Low Rad Flat Screen Colour Monitor
- Microprocessor Controlled .27 Dot Pitch - Up to 1280x1024 Non-Int Res
- M/arts Pro-Series Desktop, Medium or Full Tower Cases - 230/250W
- 2 High Speed Serial Ports and 1 Parallel Port
- Microsoft Serial Mouse V2.0 and Mouse Pad
- Honeywell or BTC 101 Key Enhanced Keyboard
- Microsoft MS Dos 6.2
- Australia Wide 3 Years Parts and Labour Warranty on Site

60MHz Ver \$4995.00 66MHz Ver \$5295.00
POWER PACK Options: Diamond Viper PCI Accel - Add \$400.00
PCI 2MB IDE Cache Controller - Add \$300.00

Microarts 486-100MHz Power-Pro VESA *Energy Star*

- Intel486 DX4 100MHz 3.3V CPU - 16k 1st Level Cache
- 256k 2nd Level Write Back Caching - Green Chip Set
- 2 x VLB High Performance Slots - 5 x ISA Slots
- Type 3 Zero Insertion Force Socket - Pentium OverDrive™ Socket Ready
- *Energy Star* Compliant System - Full System Power Management
- 8MB Ram on Board Expandable to 64MB using 72 Pin Simms
- Panasonic 1.44 MB 3 1/2" Floppy Disk Drive
- 340MB Fast IDE V/Coil Drive - 128k Cache - Sub 14ms Access
- Stealth 32 VLB 1MB (Exp to 2) Graphics Accelerator - Tseng W32P Chipset
- Stealth 32 Supports up to 1280x1024 Res - Supp 24 Bit True Colour
- ViewSonic 15 *Energy Star* 15" Low Rad Flat Screen Colour Monitor
- Microprocessor Controlled .27 Dot Pitch - Up to 1280x1024 Non-Int Res
- *Energy Star* VLB 32 Bit Disk Accelerator - Windows Drivers
- 2 Serial - 1 Parallel - 1 Games Port
- Microsoft Serial Mouse and Mouse Pad
- Microsoft MS Dos 6.2
- BTC 7939 101 Key Enhanced Keyboard
- 5 Year Warranty Plan - 2/3/5 Years Parts

PRICE INCLUDING SALES TAX \$4490.00

WITH 2MB STEALTH 32 AND
PROMISE 2MB VLB CACHE CONTROLLER \$4890.00

Microarts 486-66MHz Power-Pro PCI

- Intel486™ 66MHz DX2 CPU - 8k 1st Level Cache
- 256k 2nd Level Cache Expandable to 512k
- Type 3 ZIF Socket - Pentium OverDrive™ Socket Upgradable
- 8MB Ram on Board Expandable to 64MB using 72 Pin Simms
- 3 x PCI - 4 x ISA Facilities - Intel Saturn Chipset - Flash Bios - SCSI Built In
- Panasonic 1.44 MB 3 1/2" Floppy Disk Drive
- 340MB Fast/SCSI-2 V/Coil Drive - 128k Cache
- PCI Fast/SCSI-2 Disk Accelerator and Controller Standard
- Stealth 32 PCI 1MB (Exp to 2) Graphics Accelerator - Tseng W32P Chipset
- Diamond In Control Windows Productivity Utility - Power Management
- Diamond Stealth 32 PCI *Energy Star* Compliant "Green" Compatible
- Stealth 32 Supports up to 1280x1024 Res - Supp 24 Bit True Colour
- ViewSonic 15 *Energy Star* 15" Low Rad Flat Screen Colour Monitor
- Microprocessor Controlled .27 Dot Pitch - Up to 1280x1024 Non-Int Res
- M/arts Pro Series Desktop or Medium Tower Cases - 200/230W
- 2 Fast Serial Ports (Fast UART) - 1 Parallel Port - 1 IDE H/Drive Port Built In
- Microsoft Serial Mouse and Mouse Pad
- Microsoft MS Dos 6.2
- BTC 7939 101 Key Enhanced Keyboard
- 5 Year Warranty Plan - 2/3/5 Years Parts

PRICE INCLUDING SALES TAX \$3895.00

Service and support options

Company	TECH SUPPORT						
	Telephone tech support for end users:						
	Tech support without charge	Toll-free number	Hours when phone is attended	Tech support via public bulletin board	Tech support via private bulletin board	Automated voice information line	
Acer	✓	×	8:30am - 5:30pm (M-F)	×	✓	×	
All Data / Arrow	✓	×	9am - 5pm (M-F)	×	×	×	
Apple	✓	✓	9am - 9pm (M-F)	×	×	×	
AST	✓	×	8:30am - 5:30pm	×	✓	×	
Brother	×	×	8:30 - 4:30pm (M-F)	×	×	×	
Canon	✓	✓	8:30 - 5:15pm (M-F)	×	✓	✓	
Compaq	✓	✓	8am - 8pm (M-F)	✓	✓	✓	
Compucon	✓	×	9am - 6pm (M-F) 8:30am - 12:30pm (Sat)	✓	×	×	
Dataproducts	✓	×	9am - 5pm	×	✓	×	
Digital	×	✓	8am - 8pm 7 days	×	✓	✓	
Edge	×	×	9am - 6am (M-F) 9am - noon (Sat)	×	×	×	
Epson	✓	×	8:30am - 6pm (M-F)	×	✓	×	
Fujitsu	✓	×	N/S	✓	×	×	
Hewlett Packard	Limited time	×	9 - 5pm (M-F)	×	✓	×	
IBM	Limited time	×	24 hours	×	×	×	
Ipex	✓	×	9am - 5:30pm (M-F)	×	×	×	
Lexmark	✓	×	8am - 6pm	×	✓	×	
Magtron Monitors	✓	×	9am - 5:30pm (M-F)	×	✓	×	
Microarts	✓	✓	8:30am - 6pm (M-F)	×	✓	×	
Mitac	✓	✓	8am - 7:30pm (M-F)	×	×	×	
NEC	✓	✓	9am - 5pm (M-F)	×	✓	×	
OITI	✓	✓	8:30am - 5pm (M-F)	×	✓	×	
Olivetti	✓	×	8:30am - 5pm	×	×	×	
Optime	✓	×	8am - 6pm	×	✓	✓	
Osborne	Limited time	✓	7:30am - 7:30pm (M-F) 10-2 (Sat)	×	✓	×	
Panasonic	✓	×	8:30am - 5pm (M-F)				
Philips	✓	×	8:30am - 5:30pm	×	✓	✓	
Profound	✓	×	9am - 5:30pm (M-F)	×	×	×	
Star	✓	×	9am - 5pm (M-F)	×	✓	×	
Tatung	✓	×	9 - 5pm (M-F)	×	×	×	
Teco	✓	×	8:30am - 5:30pm (M-F)	×	×	×	
Toshiba	✓	✓	9am - 5pm (M-F)	×	×	✓	
Videocom	✓	×	9am - 6pm (M-F) 9am - 1pm (Sat)	×	×	✓	
Viewsonic	✓	×	9 - 5:30pm (M-F)	×	×	✓	

				Manufacturer's warranty	
Fax-back service	Free-based services	Newsletter	CD-ROM	Parts	Labour
×	×	✓	×	3 years	1 year
✓ 9am - 5pm (M-F)	×	×	×	2 years	5 years
×	×	✓	Service source, available to Apple resellers only	Now, 3 months exchange	N/A
×	×	✓	×	1 year + (2yrs free option)	1 year + (2yrs free option)
✓ 8:30am - 4:30pm (M-F)	×	×	×	1 year	1 year
×	×	✓	×	1 year	1 year
✓	×	×	✓	3 years	1 year
✓	Warranty extension (systems only)	✓	×	2 years	2 years
✓	×	×	×	1 year	1 year
✓	✓	✓	×	1-3 years	1-3 years
×	✓	×	×	2 years	2 years
×	×	×	×	1 year	1 year
×	×	×	×	3 months	N/A
✓	✓	×	×	3 years	1-3 years
×	✓	✓	×	1-3 years	1-3 years
✓	×	×	×	3 years	3 years
×	×	✓	×	1-3 years	Varies from product to product
✓	✓	×	×	1 year	1 year
✓	✓	×	×	2 years	5 years
✓	×	×	×	2 years	2 years
×	✓	✓	×	1 year/2 year option	1 year/2 year option
✓	×	×	×	1 year	1 year
Resellers only	✓	✓	×	3 years	3 years
×	×	✓	×	3 years	3 years
✓	✓	×	×	5 years	5 years
				1 year	1 year
✓	✓	✓	×	2 years	1 year
✓	✓	×	×	5 years	5 years
✓	×	×	×	1 year	1 year
✓	×	×	×	1 year	1 year
×	×	×	×	2 year	2 year
✓	×	×	×	1 year-3 years	1 year-3 years
×	✓	×	×	2 years	2 years
×	×	×	×	1 year	1 year

Prize winner

Optima Computer Technology kindly donated the incentive prize for APC's annual Service and Reliability Survey. Pictured below are: (left to right) Julie Dominguez, Victoria and Tasmania Sales Manager for APC, competition winner Andrew Clark, and OCT's Victoria State Manager, Christopher Walters.

The prize was a Pentium-based PC system worth \$8000. The OCT P5-60MHz system incorporates the latest in Pentium and PCI technologies and was supplied complete with 8M of RAM, a 300M fast SCSI hard drive and PCI local bus SCSI controller. The display is handled by a Genoa Phantom PCI video accelerator with 2M interleaved DRAM and a 1.5in 4G non-interlaced colour monitor. Optima also threw in a double-speed, photo-ready CD-ROM SCSI, a 3.5in floppy drive, MS-DOS 6.2 and Windows for Workgroups 3.11.

Andrew Clark, a director with Mitre 10, completed his 1994 Service and

Reliability questionnaire on his current machine, a MicroArts 486DX. Andrew won the Pentium by completing a slogan at the end of the questionnaire. Our congratulations go to Andrew on winning this state-of-the-art prize and our thanks to Optima.



From page 84

magazine, is largely due to its editorial independence, and publication of this survey's findings is a testament of our continued commitment to readers.

We are not publishing our opinion: we are summarising yours, and those of your peers. Some vendors who have performed badly in the past have taken notice of the results and, instead of attempting to sue the messenger, have diverted their efforts and resources to fixing the problem. The survey has returned dramatically improved results for some of these vendors.

As usual, results are broken down into three sections: PCs, monitors and printers. At the start of each of these three sections an introduction is given summarising the main findings of our research. The introduction is followed by an alphabetical case-by-case study of each vendor's results.

Each vendor summary covers overall reliability and reports the proportion of users who would buy from the same vendor again. Data is also given on the proportion of users who had experienced a difficulty, the proportion making contact with product support and the ease with which product support was obtained. Users then rated their satisfaction with both product support and repair services and reported the number of days the product had been out of action during the past 12 months. We also record the average period of usage for equipment supplied by each vendor.

In each section of the results we have

compared overall performance with previous years. The good news is that users are reporting a trend for improved after-sales support. Vendor efforts in this direction are being well received by end-users.

Future directions

As the PC product market matures, after-sales service will take an increasingly important role in the purchase decision-making process. The home PC market is exploding at the moment. Peer pressure on parents is increasing; children cannot be left out of touch with developments in multimedia and the much publicised information superhighway.

It is vital that novices are given purchase advice that points them in the direction of vendors who are prepared to support their clients long after the sale.

In the coming year, it is likely that some key players will attempt to unbundled after-sales support as the pressure on base prices increases. Already, we are seeing an increasing tendency for vendors to advertise prices for unrealistic systems; too small a monitor and too little RAM being the most common.

The purchase decision will become far more complex as purchasers are forced to add the real cost of purchase for themselves. An individual's demand for technical support will have to be equated along with a detailed analysis of technical requirements. The APC Service and Reliability Survey will become an increasingly important tool in this decision-making process. ▲

Five Point Index

In this year's annual Service and Reliability Survey, we have attempted to summarise the results of each section of our research into one chart. Readers are warned that the scores presented in our Five Point Index charts are offered as an indication only of a company's overall performance. In all cases the introduction to a section should be read together with the full text of selected vendors to give an appreciation of each vendor's strengths and weaknesses.

The Five Point Index is based on the results to five of the most important questions asked in the Service and Reliability Survey:

- How would you rate the PC/monitor/printer for overall reliability?
- How easy was it for you to contact product support?
- How satisfactory was the product support you received?
- How satisfactory was the repair service you received?
- Would you buy a PC/monitor/printer made by the same vendor again?

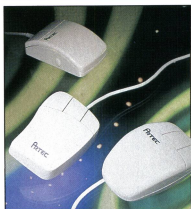
The results of the first four questions are converted to a score out of 10 (see Methodology for details). The result of the last question is expressed as a per cent and divided by 10 for the purpose of this analysis. All five scores are averaged (mean) and the result becomes our Five Point Index.

The overall averages are based on results obtained from all 4672 participants in this year's Service and Reliability Survey. Each respondent's comments carries equal weight; we do not average vendor scores to eliminate market share bias in calculating averages. As can clearly be seen in the printer market, the largest vendors are setting a high standard which many competitors are finding hard to match. Averaging scores to eliminate market share bias would give vendors an unfair representation of the state of the market. Users would gain an unfair impression of the 'average' experience and could be prepared to accept a standard below that enjoyed by the majority of users.

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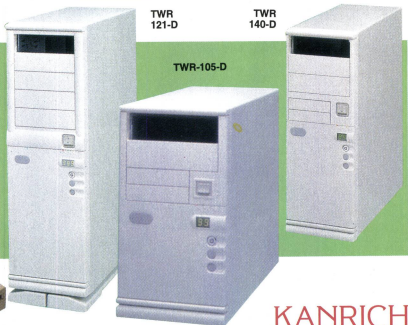
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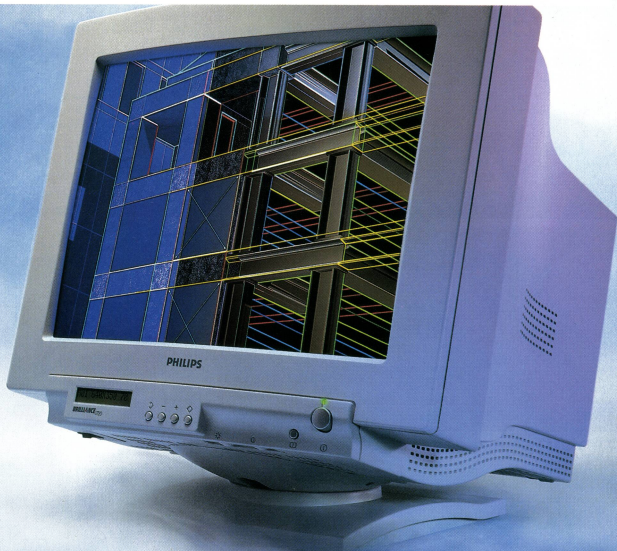
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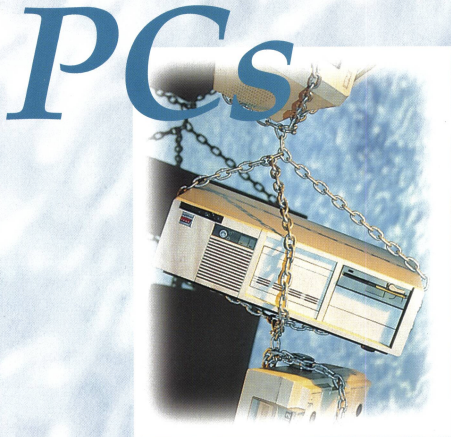
TAKE A CLOSER LOOK



PCO0001B



PHILIPS



BY GEOFF ISAAC

Readers responding to our Annual Service & Reliability Survey rated 20 PC companies, putting newcomer Digital on top of the pack and Amstrad at the bottom.

Digital is undoubtedly the star performer in this year's PC section of our Service and Reliability Survey. Never before included in our published results, Digital came from nowhere to take the lead in our Readers' Choice Five Point Index. This vendor, made famous by its multiuser systems, was ranked first or second for every attribute surveyed. Although representation of Digital PC users was small (37 in total) the results remain impressive.

This news could not have come at a better time for Digital. On a worldwide

basis the vendor is teetering with staff cutbacks and prolonged losses challenging investor confidence. A rosy future depends, in part, on Digital's success on the desktop. Market acceptance of the Alpha process is a crucial factor in that success.

In the meantime, high volume sales of Intel-based PCs is the only way Digital is going to get a foothold on the desktop market. The top Readers' Choice award in this our fourth Service and Reliability Survey gives Digital's PCs an invaluable endorsement.

Local assemblers dominated the PC

Readers' Choice selections with Osborne, Optima, Compucon and Profound all achieving Five Point Indices significantly above average. Olivetti was the only non-local assembler to feature in the above-average category.

Osborne continues to mirror its sales success in the findings of the Service and Reliability Survey, going from strength to strength both in the market and with customer satisfaction. Osborne's unique strategy, incorporating extended warranty periods supported by self-owned sales and support units throughout the country, is clearly paying off.

Profound is the only major PC vendor to have matched Osborne's five-year warranty. This relatively silent achiever is struggling to maintain market share, but Profound performed well for the second consecutive year.

Apple has traditionally performed well in the survey, but this year users awarded a Five Point Index just 0.1 above the overall average. A decline in after-sales scores accompanied by a worrying drop in the brand loyalty indicator suggests problems for Apple. Changes in the distribution channel have obviously created problems and these present themselves at a time when Apple is concentrating on building market acceptance of the PowerPC.

At the bottom end of the ranking Amstrad and Commodore resided, with the former achieving a score over a point behind the latter. Both companies have, since the field work for this survey was completed, announced their withdrawal from the Australian market. Amstrad in particular has not performed well in previous surveys and results demonstrated that Amstrad could not rely on a high proportion of its installed base giving the company the all important, favourable word-of-mouth recommendations.

Local assembler EDGE was left as the only currently trading PC vendor to be ranked below average in our Five Point Index. The company scored relatively badly across the board with only seven out of 10 end users saying they would buy from the company again.

Two world famous vendors, NEC and IBM, were awarded Five Point Indices just below the overall average. Both vendors have enjoyed recent sales success; NEC largely due to its UltraLite Versa series of portables and IBM with three tiers of desktop products and an impressive portable range. The results of our fourth Service and Reliability survey can only be a disappointment to these vendors, with end users marking down attributes related to after-sales support.

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Overall results

Satisfaction with PCs is on the increase, with all the important survey attributes being awarded higher average scores in response to this year's survey, compared with the past three. Overall, reliability was rated at 8.2 in 1991, increasing to 8.6 last year and reaching 9 points this year. This result clearly summarises that the majority of users are more than satisfied with the day-to-day performance of the majority of machines on the market.

Demand for product support has dropped from three out of four users (74 per cent) in our first survey to stabilise at exactly two out of three in our last two surveys. The ease with which product support was obtained was rated at 7.8 this year, up from 7.4 in 1991. Satisfaction with product support has also shown a significant increase, from 6.9 in 1991 to 7.4 this year.

Repair service satisfaction has shown an even more dramatic increase, up from 6.8 in 1991 to 7.8 this year. These results clearly illustrate that the market has perceived an overall improvement in after-sales support during the life of the survey.

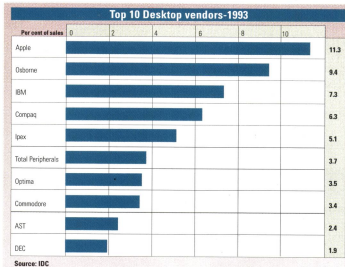
Interestingly, despite these increases, overall brand loyalty has remained relatively constant over the four years of the annual APC surveys. In 1991, 77.4 per cent of PC users said they would buy from the same vendor again, while this year 81.4 per cent gave this response.

Specific problems

This year we invited respondents to give details of the specific problems they encountered with their machines. Nearly six out of 10 users took the opportunity to identify problems related to their PC. Disk drives were, of course, the major cause of grief, with over one in four of those respondents who reported a problem blaming the hard disk (25.7 per cent). Floppy drive problems were mentioned by 12.5 per cent.

Other components caused gripes too. The motherboard was implicated by 14.6 per cent of these respondents, while power supply problems were mentioned by 12.1 per cent. Video card problems were identified by 9.3 per cent, RAM by 9.1 per cent, and the keyboard by 5.4 per cent. All other identified problems were reported by less than one in 20 of the users who specified the nature of their complaint.

Only a fifth of the sample made specific



The above chart is based on information supplied by International Data Corporation. Please note the chart is based on desktop sales alone. Our survey includes portables, and response rates are an indication of installed base, not sales as shown in this chart

reference to a problem they had encountered with obtaining after-sales service. Just over a quarter of these (26.4 per cent) made special reference to slow service — this was easily the most common complaint.

A lack of knowledge or interest on the part of the service provider was mentioned by 13.4 per cent of those detailing their complaint, while 7.6 per cent complained of rude or unhelpful staff. Just over one in 10 complaints (10.6 per cent) made specific reference to the difficulty experienced in trying to make contact with someone who would provide support.

Other complaints were nominated by a minority of users; 8.2 per cent saying the service provider had not kept the customer informed of developments, and 7.2 per cent said the service was not satisfactorily completed. Distance from supplier support was also a regular complaint, with 6.8 per cent mentioning the cost and/or time involved with transportation. Nearly six per cent mentioned the necessity and cost of interstate or long distance phone calls.

Power users increase

Back in November 1990 (when we completed the fieldwork for our very first survey) less than four out of 10 (38 per cent) of the APC readers participating in the research were using a 386SX or above. This year, that proportion increased to over nine out of 10 readers (92 per cent), as shown in the accompanying graph.

In particular, the acceptance of the 486DX processor has been phenomenal. Machines based on this processor did not even feature in our first survey; by 1992 486DX users accounted for eight per cent of the sample, and that proportion had tripled

by 1993. This year, nearly half of the users participating (45 per cent) were using a PC with this processing power.

Only a small handful of respondents had a Pentium-based machine at the time of this survey. Research among readers of APC, and sister publications PC Week and PC User, strongly indicates that the Pentium will not have its day until at least 1995. When asked to predict purchasing trends for 1994, Pentiums were predicted to account for less than six per cent of total purchases. The 486SX has been effectively squeezed out of the market, with users accounting for just 14 per cent of the sample. Although this represents a significant growth from last year's eight per cent, the performance is dwarfed by that of the processor's more powerful brother.

The 386 market is clearly in rapid decline, with users accounting for a high of 57 per cent of the sample in 1992, falling to 51 per cent last year and reaching just 33 per cent this year.

The usage of machines based on anything less than a 386SX is in near perfect exponential decline. In 1991 these low-end users made up 63 per cent of the sample, falling to 35 per cent in 1992 and reaching 17 per cent last year. This year, they accounted for just eight per cent of the machines used by the sample.

While Service and Reliability results give a good indication of the profile of machines in use in Australia today, they are not indicative of current sales. IDC recently released its estimates for PC sales during 1993. Desktop market share figures are shown in the accompanying graph. Please note figures shown are restricted to the desktop market only, while the Service and Reliability Survey covers some portable machines as well.

Digital was the only newcomer to this section of the survey this year. Three vendors disappeared from our analysis; Epson, who withdrew from the Australian PC market over two years ago, and Samsung and KT Technology. All failed to achieve a sufficient response rate to be included.

ACER

FIVE
POINT
INDEX

8.3

RANK EQUAL 7th

Acer has been represented in Australia since 1990 and has, so far, enjoyed an enviable reception here. At the end of last year IDC ranked Acer as the 10th



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Another award-winning board available for either the PCI or VL bus is **WindowsVGA 64**. This true 64-bit board built around the Cirrus Logic GD5434 GUI engine, offers resolutions up to 1,280 x 1,024. Plus, it displays 16.8 million colors at 1,024 x 768. With Genoa's proprietary drivers, WindowsVGA 64 enhances the performance of Windows and other graphics environments.

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largest PC vendor by revenue. IDC estimated revenue from PCs alone had increased by 139 per cent over the previous year to reach \$44 million.

In addition to the usual range of PCs (including notebooks), Taiwan-based Acer designs and manufactures network and Unix servers and multimedia systems. In December last year, the company celebrated the controversial win of the Department of Social Security's personal computer contract, estimated to be worth around \$30 million for in excess of 16,000 PCs over three years.

In March this year, Acer announced that it had appointed Wang Australia to manufacture and assemble Acer components. The company has its own Sydney-based assembly plant, but increasing demand (from both the domestic and export markets) has led the company to expand production.

Acer products are backed by a three-year parts and one-year labour warranty. A free technical-support service is available over the phone and a free bulletin board service is provided. Acer publishes a bimonthly newsletter for clients.

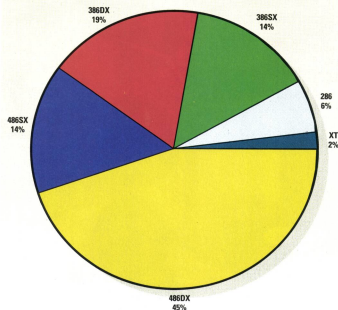
This year, we heard from 50 Acer PC users in response to our fourth Service and Reliability Survey. The level of response was disappointing as it represented just 1.1 per cent of the sample, about the same as reported in the last two surveys. Given the level of growth reported by IDC, one would expect a significant increase in sample size. Acer's success in winning large contracts (and hence having highly concentrated pools of users) could account for this apparent discrepancy.

The average age of Acer PCs included in this year's survey was just 15.3 months, over six months less than the overall average. This finding does support claims of increasing sales.

Overall, Acer performed well with all attributes rated toward the top end of the average range or above. Our Five Point Index awarded Acer a score of 8.3 — 0.4 above the overall average calculated from the 4672 participants in this year's survey.

When Acer made its debut in the Service and Reliability Survey in 1992 the results were disappointing. End users rated after-sales services below average and these bad experiences were reflected in the scores awarded for reliability and brand loyalty. Acer took notice of the feed-

Processor type



Our breakdown by processor type demonstrates the success of Intel's 486DX marketing policy. The 486SX processor has been largely bypassed by end users demanding power to run GUI applications and spurred on by aggressive price cutting by Intel to keep competitors at bay. The installed base of 286-based machines and below is in textbook exponential decline

back from the market and, by the following year, end users were noticing a difference.

This year the results have improved again; for the critical attribute overall reliability users awarded 8.9 points, 0.3 above the overall average. Back in 1992 Acer users awarded just 8.1 for reliability and this increased to 8.7 the following year.

The increase in the perceived reliability of Acer machines is not, however, completely reflected in the brand loyalty scores. In 1992 only 79.6 per cent of users said they would buy another PC from Acer. By 1993 this proportion had increased to 86.7 per cent. But this year the proportion fell, slightly, to 84 per cent. It should be noted that this year the overall proportion of respondents who said they would buy again from the same vendor fell by 1.4 per cent. The scores achieved by Acer in both surveys were toward the top of the average range.

Over a quarter of the users (28 per cent) reported experiencing at least one difficulty with their Acer PC since purchase. Overall, nearly half the sample (47.6 per cent) reported a problem. Only the users of PCs made by three other vendors were less likely to report a problem. In 1992, just over half of Acer users reported a problem (51 per cent) and that proportion fell to about a third (36.7 per cent) in 1993.

The low incidence of problems was not reflected in a proportionately low demand for product support. Two out of three Acer

users (64 per cent) said they had cause to seek assistance and this was in line with the overall average (66.6 per cent). Last year, less than half of the Acer users included in our sample (46.7 per cent) had cause to seek assistance, the lowest proportion recorded in that survey.

When asked to rate the ease with which product support had been obtained, Acer users awarded 8.2 points, 0.4 above the overall average, ranking Acer right at the top of the average range. This result is well up on the score of 7.3 awarded in 1992, but down on last year's score, 8.6.

End users awarded 7.5 points to express their satisfaction with the product support received from Acer, which was just 0.1 ahead of the overall average. This result continues an improving trend, with users awarding just 6.8 points to express their satisfaction with product support in 1992, and 7.0 in 1993.

Repair service satisfaction was rated much more impressively, with users awarding 8.3 points, half a point above average and sufficient to rank Acer equal second in the provision of these services. Again this score has improved since we last rated Acer's repair services (in 1992) when users awarded a score of just 5.6, the weakest recorded in the survey.

The average number of days Acer users reported their PC as being out of action was 1.3. This was well down on the overall average down time of three days and consistent with the good results awarded for repair services. Once again this indicator continues to move in the right direction, beginning at 5.5 days in 1992 and dropping to 1.8 days last year.

Should Acer choose to continue to improve its after-sales services the company should be a challenger for the top slot in next year's survey.

ALLDATA

FIVE
POINT
INDEX

7.9

RANK EQUAL 130

The Arrow range of PCs is manufactured by AllData at its Melbourne assembly plant. IDC estimates the company experienced moderate growth in 1992/3 over the previous year, with PC systems revenue increasing to \$17.8 million, up from \$16.2 million.

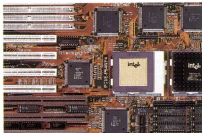
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AllData PCs are supplied with a two-year parts and five-year labour warranty, backed by free technical support via phone and a fax back service.

This year, users of AllData PCs accounted for 1.5 per cent of the entire sample, up from about one per cent in our two previous surveys. Overall, the company performed well with our Five Point Index awarding a score of 7.9, exactly in line with the overall average.

Over the four years we have been conducting the APC Service and Reliability Survey, AllData has achieved a consistent improvement in brand loyalty among its user base. Back in 1991 only two-thirds of Arrow PC users (66.7 per cent) said they would buy again from the same vendor. By 1992, this proportion had increased to just over three quarters (76.5 per cent) and in 1993 it improved again to 82.9 per cent.

This year, 84.7 per cent of AllData users said they would buy another PC from the same vendor — 3.3 per cent higher than the overall average.

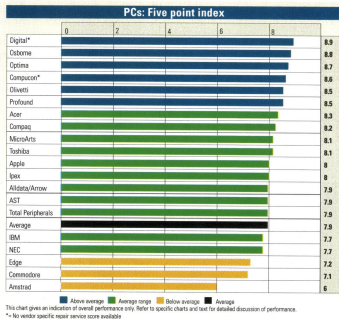
The overall reliability of AllData's PCs was rated at 8.5, an insignificant 0.1 below the overall average reliability rating. Last year, the company achieved a score of eight, the same score awarded in our first survey. In 1992, end users awarded their AllData PCs 8.3 for this same attribute.

Just under half (47.2 per cent) of AllData users said they had experienced at least one difficulty with their PC since purchase, while nearly two thirds of end users (63.9 per cent) said they had cause to contact product support. Both scores fell in the average range.

When asked to rate the ease with which product support had been obtained, AllData users awarded 7.6 points, 0.2 less than average. This score represents a significant improvement on those awarded in 1991 (6.8) and 1992 (6.7), but is down on the 7.9 awarded last year.

Satisfaction with product support was rated at 6.9, half a point below average. In 1991 end users awarded 5.6 points for the same attribute and this increased to 6.8 in 1992. Last year, the score appeared to flatten out at seven points and this year's score confirms that.

Repair service satisfaction was rated at 7.9, 0.1 above the overall average recorded by this year's survey. In 1991, end users awarded a score of just 5.2 to express their



In response to reader requests we have attempted to summarise the main findings of our PC research in one chart. We have taken the scores awarded for five major attributes surveyed and calculated an average for each vendor. This chart is only an indicator of overall performance as averages can be misleading. A vendor might, for example, have achieved excellent scores for product support but fallen down for overall reliability. Readers are encouraged to refer to the main text for detailed results. The spectacular debut performance by Digital is highlighted by this summary chart. An additional five vendors fought for the top ranking position. At the other end of the scale Amstrad and Commodore were exiting the local market as we went to press.

satisfaction with repair services, the lowest score recorded in the survey. By 1992 that score had increased to 7.5. Unfortunately, we received insufficient response to rate the repair services offered by AllData in last year's survey.

Despite the improved scores awarded for repair service satisfaction, end users reported their PCs had been out of action for an average of 4.4 days during the last year, well up on the overall average of three days. Only the users of one other brand of PC reported a longer average down time.

AllData does not provide all the product support options currently made available by technology (in particular bulletin boards are an obvious omission). Provision of these services should improve after-sales support scores still further and ensure a better-than-average performance in our next survey for this local assembler.

Sufficient replies were received to look at the scores awarded by 486DX users in isolation. A score of 8.1 was awarded for overall reliability, 0.4 below the average awarded by all AllData users participating in our research. This lower reliability rating was reflected in the brand loyalty indicator, with just 79.5 per cent of 486DX users saying they would buy another AllData PC compared with an average rating of 84.7 per cent.

AMSTRAD

FIVE POINT INDEX 6.4

RANK LAST

At the time of writing this report, Amstrad had just announced its departure from the local PC market. The company was looking for an organisation to take over the service and support of existing clients.

Since the Service and Reliability Survey commenced in 1991 results have indicated that the tide was strongly against Amstrad's success. This year, with a brand loyalty score of only 35 per cent, it looks as though the ebbing tide has turned into a rip.

Alan Sugar's company has been involved with PCs since 1984 and represented in Australia since 1988. Local MD Bordan Tkachuk won Computer Marketer of the Year in 1989 after introducing bundling (not only software, but training) to the local market. In the same year Amstrad PCs generated \$58 million.

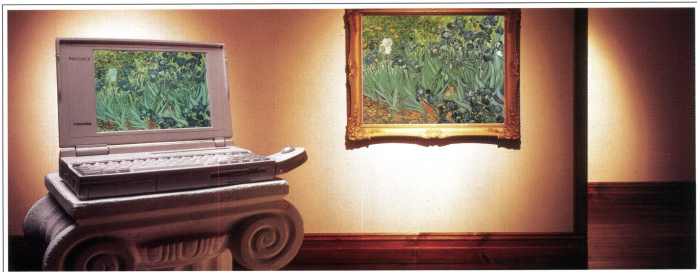
At the end of last year IDC estimated Amstrad's PC revenue for 1992/93 was only \$26.5 million, down 30 per cent on the previous year — a sad result for this British-based organisation that once controlled over 10 per cent of the local market.

Amstrad had a recent attempt at returning to fame and glory with an early entry to the PDA (personal digital assistant) market but, despite its cheap price tag, failed to capture the market's imagination.

This year, we heard from 100 Amstrad users representing 2.1 per cent of the installed base surveyed. In 1991 Amstrad users accounted for 6.4 per cent of our sample; only IBM users accounted for a larger proportion of our sample. By 1992 Amstrad users accounted for four per cent of the sample and that proportion decreased to 2.8 per cent last year. Despite this rapid decline Amstrad still ranks as the eighth most popular brand of PC in use among the population surveyed.

At the end of 1993 IDC ranked Amstrad as the 16th largest vendor of PCs by dollar value operating in Australia.

As would be expected from the rapidly declining response rates, indicating an even more rapidly declining market share, the average age of Amstrad PCs included in our survey was well above average. The average age of all the PCs included in this year's analysis was 22 months. Amstrad



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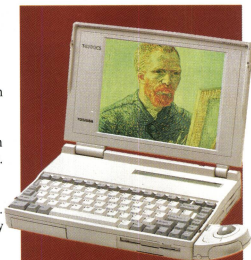
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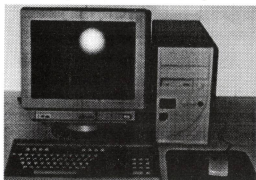

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users reported their machines had been in use for an average of 39.3 months, nearly double the overall average.

No other vendor achieved a lower score in our Five Point Index, with Amstrad users rating their PC below average for all the important attributes surveyed.

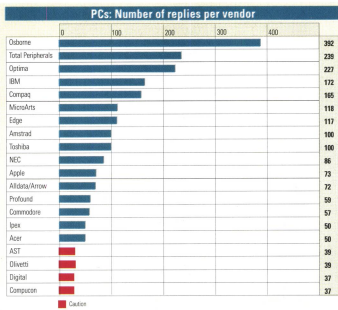
When users were asked to rate their Amstrad machines for overall reliability, they awarded an average of just 7.5 out of 10. No other vendor achieved a lower reliability rating for the second consecutive year. Amstrad's reliability rating for the four APC Service and Reliability surveys conducted so far have all fallen in the range 7.4 to 7.6.

This low reliability rating has consistently been reflected in user brand loyalty. In 1991, over two thirds of Amstrad users (69.2 per cent) said they would buy another PC from the same vendor. By 1992, the brand loyalty rating fell to six out of 10 (60.2 per cent) and, by 1993, only just over half of those users surveyed (52 per cent) said they would buy Amstrad again. This year this important indicator of brand loyalty fell to just under four out of 10 Amstrad users (38 per cent). Amstrad was ranked dead last for the second year running, achieving the dubious honour of having the lowest brand loyalty rating ever recorded by the survey.

High scoring vendors regularly achieve loyalty ratings well past 90 per cent, emphasising the problems facing Amstrad. As the old saying goes, if you keep a customer happy they will come back (and maybe tell a friend or two); if you fail they will tell 10. When you have achieved a market share of 10 per cent and over, you risk a lot of bad word of mouth if you fail to please.

Exactly half of the Amstrad users participating in our survey said they had experienced at least one problem with their PC since purchase. Given the significantly older than average age of these Amstrad PCs, and the relatively low reliability score awarded, it is surprising the proportion of people experiencing difficulties was only slightly above average (47.6 per cent). This result was no where near the two thirds of the users of Edge PCs who reported a problem.

Consistent with this finding demand for product support was relatively low with only just over half of users (55 per cent) saying they had sought assistance com-



We received 4672 replies to this year's Service and Reliability Survey reporting on PC performance. For each of the 20 vendors shown in the above chart we received at least 35 replies. The above chart does give a good overall indication of the breakdown of the Australian PC installed base. However, Apple is under-represented in our sample as the field work for this research was conducted through APC which is of greater appeal to IBM-compatible PC users. The chart is not meant as an indicator of current market share.

pared with an overall average of two thirds (66.6 per cent).

When Amstrad users were asked to rate the ease with which product support had been obtained they awarded 6.2 points, the weakest score given for this attribute. This score continued a downward trend from 7.2 in 1992, to 6.6 last year.

Satisfaction with the product support received was rated at 6.3, over a point below average but just sufficient to keep Amstrad off the bottom of the league. This result was consistent with the findings of our first two surveys: 6.5 in 1991 and 6.4 in 1992 and up slightly on last year's rating of 5.9.

Repair service satisfaction was rated at 6.2, by far the weakest result in this year's published findings. However, it should be noted this score is the best for Amstrad for three years: having been awarded 6.5 in 1992, the score fell to 5.9 in 1992 and was followed by 5.7 last year.

On average, Amstrad PCs had been out of action for 5.9 days during the last year, nearly double the overall average down time reported. It should be remembered, however, that Amstrad PCs tended to be substantially older than the overall average recorded by the survey.

PCs based on the 386SX processor would appear to have caused their users even more problems than the average scores indicate. The brand loyalty score awarded to 386SX machines was just 6.9, over half a point below Amstrad's average. Exactly a third of the 386SX users (38 per

cent) said they would buy another PC from Amstrad, down from the average brand loyalty rating of 38 per cent.

Finally, the ease with which product support was obtained for 386SX machines was ranked at just 5.7, half a point below the vendor's average — although the score awarded for satisfaction with support received was exactly in line with Amstrad's overall average, 6.3.

APPLE

FIVE POINT INDEX

RANK EQUAL 11th

Apple Computer Australia, part of an eight billion US dollar worldwide organisation, was formed in 1982 and has, since 1985, enjoyed the enviable position of having the largest market share of any microcomputer vendor operating in Australia.

In 1991 Apple's share of the microcomputer market was (according to IDC) 14.3 per cent by revenue and 13.9 per cent by unit sales. In the year to September 1993, IDC estimated Apple's revenue from PC systems was \$220 million, up from the \$185.5 million reported in the previous year.

On a worldwide basis however Apple's profits have fallen dramatically, with 1993 turning in just \$US86.6 million (on turnover of nearly \$US8 billion) compared with \$US530 million the previous year.

Following a popular trend among the giants of the IT industry Apple replaced its CEO, John Sculley, during 1993. New man in the top job, Mike Spindler, took a hatchet to staff levels and margins to enable Apple to compete on price.

Low-end machines were produced to compete for the SOHO market, the PowerPC concept was launched; while the Newton met with initial critical acclaim but market adoption has been slower than hoped.

To accommodate the new emphasis on the low-end the dealer channel had to be restructured and the likes of Brashes and Myers were added. Meanwhile, Apple Centres were freed from the constraint of being unable to stock competing product. (More company information is given in the monitor section.)

Apple supports its products through a network of company trained resellers; direct contact with the vendor is limited to 008 technical support numbers and a newsletter.

Apple was represented in our survey by

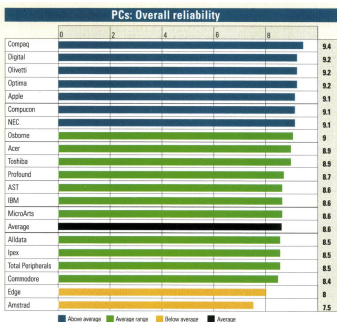
73 users accounting for 1.6 per cent of the sample, up from 1.3 per cent last year. Overall, Apple's results were in line with the average recorded by the survey. Our Five Point Index awarded Apple a score of 8, 0.1 above the overall average.

For overall reliability Apple users awarded a score of 9.1, half a point above the overall average and consistent with previous findings (all in the range 9 to 9.2). Only an outstanding performance by Compaq prevented Apple's result from being indistinguishable from the top spot (which it occupied last year).

Of real concern to Apple must be the falling brand loyalty rating recorded by this year's survey. In previous years, nearly all Apple users participating in our research said they would buy another microcomputer from Apple (94.8 per cent in 1991, 98.2 per cent in 1992 and 97.7 per cent last year). This year, only 83.6 per cent of users said they would buy another Apple. Although this result is in the average range it can only cause disappointment for Apple. The success of the PowerPC could well prove critical to reversing this trend.

Only a quarter of Apple users said they had experienced at least one difficulty with their PC since purchase. This was well below the overall average (47.6 per cent) and, in fact, only the users of PCs made by DEC were less likely to report a problem.

As would be expected from such a low incidence of problems, only half the Apple users participating in our research (50.7 per cent) had cause to contact product support. On average exactly two thirds of



The overall average score awarded for reliability (8.6) was exactly in line with that awarded last year. Six vendors achieved above-average ratings for reliability with Compaq taking the top spot for the first time; the company's third consecutive appearance in the above-average category. Newcomer Digital made an outstanding debut, tying for second place with Olivetti and Optima (both newcomers to the above-average category).

the sample said they had sought assistance.

When asked to rate the ease with which they had obtained product support, Apple users awarded just 7.8 points. Although this score was exactly in line with the overall average it represents a significant departure from the standard of excellence normally associated with this brand. Last year, users awarded nine points for this attribute up from 8.3 in 1992.

Similarly, satisfaction with product support was rated at 7.2, 0.2 below average and 1.1 below last year's score. In both 1991 and 1992, Apple users awarded a score of 7.9 for this attribute.

Satisfaction with repair services of-

fered also appears to have fallen. In 1991 the company achieved a score of 7.9 followed by 7.7 in 1992. Last year, Apple achieved the top score for repair services offered: 8.6. This year, end users awarded just 7.3 points, half a point below the overall average.

Despite the relatively weak score awarded for repair services, Apple users reported their machines had been out of action for an average of 1.6 days, nearly half the overall average downtime.

Overall, Apple's results were down on previous years. As discussed in detail in the monitor section, this vendor would appear to be falling behind in the provision of after-sales support options. In addition, Apple must be successful in its migration from the 680x0 series to the PowerPC to survive. Success of the launch of this new range of products will be reflected in the brand loyalty score achieved in next

year's survey.

AST

FIVE POINT INDEX

RANK EQUAL 13th

AST became established in Australia in 1988. Today the company employs 58 staff and has offices in Sydney, Melbourne, Brisbane and Canberra, with clients focused in the corporate sector.

AST opened an assembly plant in Lane Cove, Sydney, at the end of 1993 and now assembles product for both the Australian and New Zealand markets. This move also strengthens the company's position for chasing government business.

IDC ranked AST as Australia's fifth

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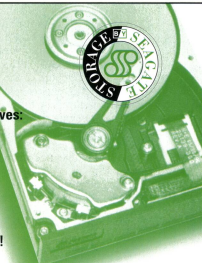
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largest PC vendor by dollar value in 1993. Revenue from PC systems was estimated to have increased by nearly 50 per cent over the previous year to \$67 million.

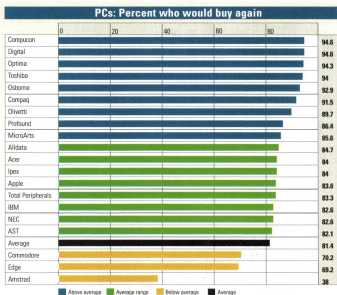
The US-based parent acquired Tandy's computer operations and GRiD Systems during 1993 and is well placed to bring out new products (such as PDAs), integrating technology acquired from these acquisitions.

AST PCs are supplied with a one-year parts and labour warranty with a two-year free option available. Clients have access to free technical support via telephone and AST plans to operate a fax-back service starting in this year's third quarter. A bulletin board and newsletter are also available to clients. There are 50 authorised service centres in Australia with Bull and Wang among those authorised to provide after-sales support.

The large increase in sales reported by IDC was not reflected in our sample base, with only 39 users of AST PCs appearing in our survey. In the past, AST has been strong in the corporate sector and successful in achieving high volume sales to individual clients. Such activity can be expected to lead to under-representation of market share in a random survey of this nature.

Overall, and consistent with the findings of previous surveys, AST's performance was average. Our Five Point Indicator awarded this vendor 7.9 points, exactly in line with the overall average awarded by all 4672 participants in this year's survey.

For overall reliability, AST users rated their PCs at 8.6, exactly in line with the average. This result was in line with the 8.7



Overall brand loyalty among PC users would appear to be slightly on the decline, perhaps reflecting the market's move towards commodity status. However, the decline is hardly significant, down from 84.1 per cent in 1992 to 81.4 per cent this year, and should not cause panic among the brand names!

awarded in 1992 (when AST made its debut in the Service and Reliability results) but down on the 9.1 awarded last year.

AST's brand loyalty indicator was, for the third consecutive year, in line with the overall average, with 82.1 per cent of users saying they would buy again from this vendor, against an overall average of 81.4 per cent. Last year, 81.3 per cent said they would buy AST PCs again and 83.3 per cent gave this response in 1992.

Just over four out of 10 users (41 per cent) reported experiencing at least one difficulty with their PC since purchase, and this was below the overall average of 47.6 per cent. Similarly, demand for product support was just below average with 56.4 per cent of users saying they had sought assistance against an average of exactly two thirds.

The ease with which product support was obtained was rated at eight points, 0.2

above average and consistent with last year's rating, 7.9. In 1992, end users awarded AST only 7.4 for this attribute.

Satisfaction with the support provided was rated at 6.9, half a point below average. In contrast to the above finding this score was consistent with that awarded in 1992 (6.9) but down on the 7.3 awarded last year.

Repair service satisfaction was rated at 7.6, just 0.2 below the overall average. In 1992, provision of this service was rated at 6.9. Insufficient response was received to rate this service last year.

Consistent with the average range rating awarded for repair services, AST users reported their machines had been out of action for an average of 2.9 days, 0.1 of a day less than average.

It should be highlighted that average results in this survey imply a perfectly acceptable standard of service. AST has consistently achieved Service and Reliability results which suggest their products and after-sales support at least meet the standards experienced by the majority of PC users in Australia.

COMMODORE

FIVE POINT INDEX
7.1

RANK 19th

The future of Commodore in Australia remains, at the time of writing, unclear with the US-based parent reporting a second quarter loss of \$11.5 million. The local organisation, Commodore Business Machines, was placed in liquidation in March 1994 with debts estimated at \$3 million. Commodore Asia-Pacific has been appointed as caretaker of the Australian market.

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Commodore was joined by Amstrad to occupy the bottom two positions on our league generated by the Five Point Index. It is ironic that both these vendors should be facing an uncertain future in Australia as this article goes to press.

Commodore has enjoyed worldwide success in the games market but the reception given to its business machine division has never been so favourable. In this year's Service and Reliability Survey end users awarded a five point average of just 7.1 points, 0.8 below the overall average and sufficiently weak enough to rank Commodore 19th out of the 20 vendors surveyed.

Commodore users assigned a score of 8.4 for the overall reliability of their machines. Although this was the third weakest score awarded in the survey it was only 0.2 below the overall average. This result was consistent with last year's finding, 8.5. In 1991, Commodore users awarded just 7.5 for this critical attribute but users increased their score to 8.1 in 1992.

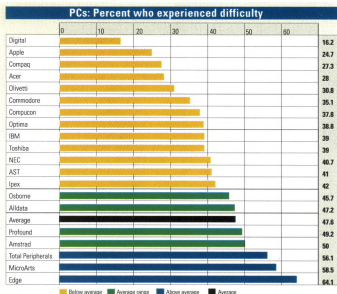
It should also be highlighted that the Commodore PCs included in this analysis were, on average, 31.4 months old, nearly 10 months older than the overall average age of all PCs included in our survey.

Seven out of 10 Commodore users said they would buy another PC from this vendor (70.2 per cent), the third lowest brand loyalty score. In previous years this all-important brand loyalty rating had been consistently improving. In 1991, only half (53.6 per cent) of the Commodore users participating in the research said they would buy again. By 1992 the proportion had increased to 73.1 per cent and by 1993 it hit three quarters exactly.

As with previous surveys, this low brand loyalty factor would not appear to be attributed to specific problems with the products. Only just over a third of Commodore users (35.1 per cent) said they had experienced at least one problem with their PC since purchase and this was well below the overall average, which approached half (47.6 per cent).

Similarly, just under half of Commodore's users (46.4 per cent) had contacted product support. No other vendor had a proportionately lower demand for technical support.

The one in two users who did need assistance were, however, not impressed



As has become the norm, half the sample reported experiencing at least one difficulty with their PC since purchase. Although the overall average score would appear to be remaining static, there are signs of improvement in performance among the vendors with a significant presence in the Australian market. In 1992, 11 vendors ranked in the above average range for this attribute, while in 1993 the number decreased to 9.

by their experiences. The ease with which support was obtained was rated at 6.6, 1.2 below average and sufficient to rank Commodore last but one. This result was consistent with that obtained in 1992 (6.7), but well down on the 7.8 awarded last year.

Satisfaction with product support received was rated at 6.1, ranking Commodore dead last for provision of these services. Once again, this result was similar to that achieved in 1992 (5.6) but significantly below the score awarded in 1993 (7.8).

Repair services fared slightly better with end users awarding a score of 7.2 — 0.6 behind the overall average but a point ahead of the weakest score (awarded to Amstrad). In line with the overall average, end users reported their Commodore machines had been out of action for an average of three days during the last year.

COMPAQ

FIVE POINT INDEX 8.2

RANK 19th

Compaq, IBM, Digital and Apple have all recently faced problems related to the rapidly evolving market. The traditional leaders of the IT industry all found themselves struggling to adapt to the new environment. These huge companies had developed large organisational structures and rapid change became increasingly difficult to implement.

Throughout the 1980's Compaq developed, and came to rely on, an impressive reputation for supplying quality products. Top-quality components were

used to build top-quality PCs that could command a top-quality premium.

As the 1990's began Compaq began to find itself struggling as increasing numbers of blue-chip clients deserted this traditional high-quality, high-premium supplier in favour of low-cost, and increasingly reliable, clone manufacturers.

As with the other major IT organisations, Compaq implemented change from the top. The new CEO turned the organisation around with the apparent ease of a flick of the switch. Compaq's strategy was similar to Apple's: create your own clone market.

In a gamble that paid off, Compaq attempted to segment its market into two. The traditional product line would continue based on high-quality, high-margin products. At the same time, a new product line was introduced to cater for the mass market. The marketing

boys were left to differentiate the products.

The strategy worked. Punters turned out, in their thousands, to buy Compaq PCs that were not Compaq but, according to the bump, still matched the company's reputation for quality and reliability.

Today, Compaq Computer Australia is challenging IBM for third place in the IDC ranking of PC sales by dollar value. Estimated revenue for the 1993 financial year was in excess of \$120 million, up from just \$78 million the previous year. The company aims to be the number one PC supplier in Australia by 1995.

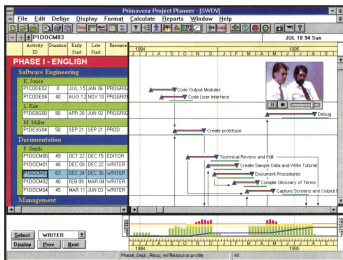
Compaq's ProLinea range of PCs is now supplemented by a range of low-cost portables and network servers. Compaq has also moved to make an assault on the high street. To achieve this it has introduced the Pressario take-out-of-the-box-and-plug-in range. So far, the company has ignored the direct channel and claims there are no plans to compete in this market segment.

Despite the fact that the low-cost, lower margin models outsell the traditional Compaq range by four to one or more, the company is not resting on its laurels. Research and development remain a priority for Compaq and the company benefits from a close relationship with Intel and Microsoft. The company enjoys plenty of publicity as a result of often being among the first to market with products incorporating new technologies. More company information is given in the monitor section.

Locally, products are supported through certified dealers with some portable repairs carried out by the vendor. All

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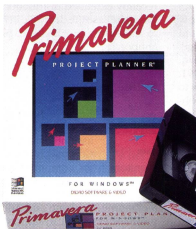
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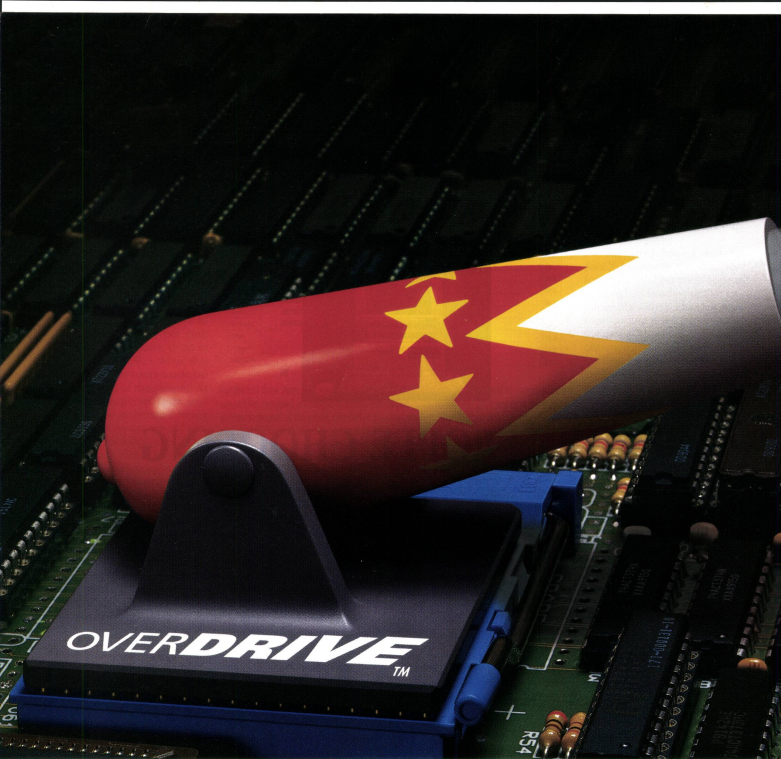


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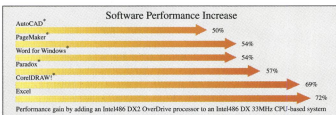




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Compucon was represented in our survey by just 37 end users. Results should therefore be treated with relative caution as only a narrow band of user experiences are summarised in the statistics.

Overall, Compucon performed extremely well in this year's Service and Reliability Survey. Our Five Point Index awarded a score of 8.6, which was well above the overall average of 7.9, sufficient to rank Compucon fourth in the PC section. This score was achieved despite insufficient response being received to rate the company for repair services, an average score was used as the default to calculate the index.

The overall reliability of Compucon PCs was rated at 9.1, half a point above average and only 0.3 points behind the top score. This score represented a significant increase on the 8.7 awarded in response to our survey last year, the first year Compucon was included in the published findings.

Compucon's overall performance was summarised in the brand loyalty score. Virtually all users (94.6 per cent) said they would buy another Compucon PC; no other vendor achieved a higher score. Last year, nine out of 10 users (90.9 per cent) said they would buy again from Compucon.

Reflecting the high overall reliability score, just over a third of users (37.8 per cent) reported experiencing at least one difficulty with their PC since purchase. Overall, nearly half (47.6 per cent) of the 4672 respondents participating in our research gave this response.

This relatively low incidence of problems was not consistent with the demand for product support. In line with the overall average, nearly two thirds of the users of Compucon PCs (64.9 per cent) reported they had sought assistance. These results are consistent with those obtained in our previous survey.

The ease with which product support was obtained was ranked at 8.9 points, over a point above the average score and sufficient to rank Compucon second (only due to Digital's exceptional result). Again the result was consistent with last year when end users awarded Compucon a score of nine, the top score awarded.

Satisfaction with product support was rated at 7.9, exactly the same score achieved last year. The company was ranked above average in the provision of these services.

Insufficient replies were received to rate Compucon's repair services, however end users reported their PCs had been out of action for an average of just 0.8 days, just

under a third of the overall average downtime recorded by the survey.

The Compucon PCs included in our analysis were, on average, 20.3 months old; roughly equivalent to the overall average age recorded.

Results from this analysis would suggest Compucon's only challenge is to maintain these standards of excellence as demand increases. A relatively enviable position to be in! Compucon is also included in our monitor section where end users rated the product in line with the survey's overall averages.

DIGITAL (DEC)

FIVE
POINT
INDEX
8.9

RANK 1st

Digital has been in Australia since 1964 and PCs are, of course, only a small part of this IT giant's business. Australian operating revenue increased by 27 per cent last year to \$560.7 million.

Similar to the Compaq experience, Digital chose a change of leadership to generate the momentum needed to bring about the restructuring needed to adapt the company to meet the changing demands of the IT industry.

Historically, DEC (as it was known then) made its money in the large system or mainframe business. As open systems, down/rightsizing and client server rapidly became adopted as IT philosophies of the 1990's, Digital found itself struggling to adapt to the environment. The company embarked on an unprecedented restructuring programme, the results of which have paid off in Australia.

On a worldwide level, Digital has not successfully completed its adjustment to the current IT environment and another round of redundancies and restructuring is underway at the time of writing.

Part of the success side of the Digital story has been its recent revamped attempt at entry into the PC market. Digital's desktop division was launched in 1992 to sell PCs direct to clients, leaving out the distribution chain, and the accompanying mark up.

Digital's appearance in this survey demonstrates it has achieved significant success in the PC arena, achieving reasonable market share. IDC estimates revenue from PCs during the 1993 financial year increased from \$14 million to \$20 million. The company has now made it to the IDC list of top 20 PC suppliers by revenue and has publicly stated its objective to be in the top five by 1995.

A large part of the long-term future of Digital now depends on the success (or otherwise) of the Alpha chip. This powerful processor has, so far, failed to capture the imagination of the market with Intel's

Pentium and the PowerPC, (produced by a strategic alliance between IBM, Apple and Motorola) apparently delivering sufficient power to meet the majority of today's desktop computing needs. The rapid development, and market acceptance, of highly demanding applications such as desktop conferencing is crucial to the development of a substantial market for the Alpha.

Digital PCs are locally assembled and 'generally' supplied with a three-year on-site parts and labour warranty. Technical support is not, however, provided free of charge, with costs starting at \$30 per incident.

An automated voice information line is in operation together with a fax-back service and bulletin board service. Digital publishes its own newsletter, *Digital News*. All after-sales support is, of course, supplied by Digital themselves.

Digital has achieved a stunning debut in this year's Service and Reliability Survey. Our Five Point Index awarded Digital a score of 8.9, higher than that achieved by any other vendor. This outstanding score was achieved despite the fact insufficient response was received to rate the company for repair services provided. To calculate the index an overall average score (calculated from all participants in our research) was used as the default.

Only 37 Digital end users experiences are represented in these findings. Results reflect a relatively narrow band of user experiences and this should be remembered when interpreting results. As would be expected from such a high overall average, Digital performed well across the board, and was ranked either first or second for all the attributes surveyed.

Virtually all Digital users (94.6 per cent) said they would buy another PC from the same vendor. No other vendor enjoyed a higher brand loyalty rating. The overall reliability of Digital's PCs was rated at 9.2, indistinguishable from the top score of 9.4 awarded to Compaq.

As would be expected from such outstanding results, Digital PC users were the least likely group of respondents to report experiencing a problem with their machine. Significantly less than a fifth of users (16.2 per cent) reported a problem. The next lowest score, awarded to Apple, was over eight per cent higher. On average nearly half (47.6 per cent) of the 4672 respondents participating in our research reported experiencing at least one difficulty with their PC since purchase.

This low incidence of problems was reported in a correspondingly low demand for product support. Just under half of the Digital users participating in our research (48.6 per cent) said they had sought assistance and this compares with

the overall average of two thirds.

The ease with which product support was obtained from Digital was rated at 9.5, the highest score awarded in the survey and over half a point ahead of that awarded to the second highest scoring vendor (Compucon). Product support satisfaction was rated at 8.5, over a point above average and sufficient to rank Digital top of the league again.

Insufficient replies were received to rate Digital's PC repair services, but end users reported their machines had been out of action for an average of just 0.1 days during the last year.

Digital's performance, despite the small sample size, can only be described as the most impressive yet seen in the Service and Reliability Survey. The only threat to the company's continued success in the PC market probably comes from within the organisation itself.

Management accounts are unlikely to show a profit for the PC division due to the allocation of enormous overhead, inherited from DEC's hey-days. As this huge organisation struggles, on a global basis, to put its books in order there is a danger that the bean counters may take the scalpel to after-sales support.

The PC division must be under enormous pressure to achieve high volumes immediately and these results can only assist Digital in this task.

Footnote: Multiple replies from two individuals using Digital PCs were received and these were excluded from the analysis.

EDGE

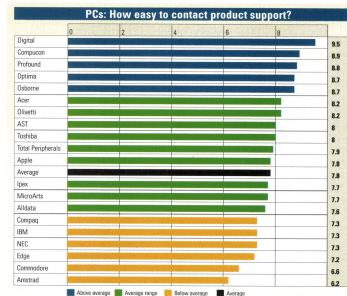
FIVE POINT INDEX
7.2

RANK 18th

Sydney-based EDGE Technology has evolved from a small keyboard manufacturing business based in Hong Kong to an Australian-owned \$140 million turnover operation dealing in both hardware and software.

EDGE began in Australia in 1988 importing electronic components for wholesaling to OEM (original equipment manufacturers) dealers and resellers in NSW. In 1991, EDGE Computer was established and interstate branches opened to provide a national network of wholesale distribution and client service centres.

1993 was a busy year for EDGE with the opening of a New Zealand division and the launch of KTX Technology to distribute



For the last two surveys the ease with product support was obtained was rated overall at 8 points. This year that score decreased slightly to 7.8

Microsoft OEM software products. Also in 1993, the company set up a national marketing organisation to target government and corporate sales and to take advantage of the changing distribution channel and get product on the high street.

EDGE backed this initiative with an Australian Standards accredited assembly plant designed to supply the marketing organisation with 'state-of-the-art' product.

EDGE now has its sights set on Asia, with Malaysia the chosen point of entry. Locally, 1994 will see EDGE target the government and education sectors together with the insurance and communications industries. EDGE has applied for Quality Assurance Certification and is part way through the programme.

IDC estimates 1993 financial year revenues from PCs reached \$55 million, a spectacular 159 per cent increase over the previous year. EDGE is now ranked in IDC's top 10 PC vendors by revenue operating in Australia.

Products are supported through a 1500 member dealer network and a technical support line. There are plans for a bulletin board service to be introduced this year. Edge offers a two-year back to base warranty as standard with onsite available at \$135 per system per year (corporate clients have onsite warranty included with system). EDGE has a technical support line and plans to introduce a bulletin board by the end of the year.

This is the third year EDGE has been included in our published findings. Results achieved this year are disappointingly consistent with those awarded in previous surveys. Overall, the company achieved a

Five Point Index score of just 7.2, the third lowest score awarded in the PC section. Only Amstrad and Commodore achieved lower Five Point Indices.

On the positive side, EDGE's dramatic increase in market share is reflected in the response rates to our surveys. When the company made its debut in the 1992 survey only 38 EDGE users participated in our research, representing 0.8 per cent of the overall response. By 1993, the response rate had more than doubled to 1.8 per cent. This year, EDGE users account for 2.5 per cent of the entire sample.

Such increases in the installed base can only be achieved by even more dramatic increases in sales emphasising the dramatic growth of this company. As so many new PCs have been introduced to the installed base, it is not surprising that the average age of EDGE PCs included in our analysis was only 17.8 months, just over four months below the overall average.

EDGE users rated the overall reliability of their PCs at just eight points, over half a point below the overall average. Only Amstrad users awarded a lower score for this critical attribute. This rating was consistent with that awarded in both previous surveys; 7.9 in 1993 and eight in 1992.

The overall below-average performance by EDGE was reflected in the company's below average brand loyalty rating. Just under seven out of 10 users (69.2 per cent) said they would purchase another EDGE PC. Again, it was only Amstrad who achieved a lower rating. In 1992, 71.1 per cent of users said they would buy from EDGE again and this increased to 74.2 per cent in last year's survey.

EDGE users were the most likely group to have encountered at least one difficulty with their PC since purchase. Overall almost exactly half the sample (47.6 per cent) reported a problem while nearly two thirds of EDGE users (64.1 per cent) gave this response.

As would be expected, this high incidence of problems was reflected in a relatively high demand for product support. Nearly three quarters of the users of EDGE PCs (73.5 per cent) had cause to seek assistance, well up on the overall average of exactly two thirds.

When users were asked to rate the ease with which product support had been obtained, end users awarded EDGE a score

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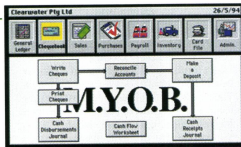
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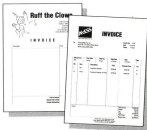
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of just 7.2 points. This score was over half a point below average and only above the scores awarded to Amstrad and Comodore.

In 1992, end users awarded a score of 7.6 to express the ease with which they had obtained help but this fell to 7.3 in last year's survey.

Satisfaction with product support was rated at 6.8, over half a point below average. This score represents a significant improvement on the 6.4 achieved in 1992 and the 5.7 awarded last year.

Repair service satisfaction was rated at 7.3 points, exactly half a point below the overall average. The score awarded was consistent with that achieved last year (7.2), well up on the 1992 score of 5.8. Despite the improved repair service performance end users reported their PCs had been out of action for an average of 4.3 days, well over a day longer than the overall average. EDGE also distributes KTX monitors and end users reported after-sales support difficulties with these products as well.

Sufficient EDGE users participated in our research to look at the replies from 386DX and 486DX users in isolation. The scores awarded by the users of 486DX PCs were all in line with the company's overall performance.

The users of 386DX-based PCs awarded just 7.5 points for overall reliability, half a point down on the company's overall performance. This result was reflected in the brand loyalty rating with only 62.1 per cent of 386DX users saying they would buy again compared with 69.2 per cent overall.

IBM

**FIVE
POINT
INDEX**
7.7
RANK EQUAL 1986

IBM has been in Australia since 1932 and has been involved with the local IT community since 1952. The rapid acceptance of open systems and the popularity of the client-server philosophy caught the founder of the PC business off-guard. Huge losses were incurred on a worldwide basis as the large and medium system markets contracted. Big Blue also found itself under increasing pressure to justify margins with large segments of the corporate market bastardising the old saying "You can't get the sack if you buy IBM" to "Buy IBM and get the sack".

As with DEC, radical change was required and both organisations took a top-down approach; in the case of IBM longtime CEO Ackers was replaced and the company embarked on a worldwide restructuring programme.

IBM's PC business was set up as a separate entity in an attempt to give the

new leaner management structure the flexibility it needed to keep abreast of rapid change. New PC ranges were introduced in an attempt to ensure that every segment of the PC market was covered. IBM moved into the high street (ahead of Compaq and Apple) and set up a direct channel to deal directly with clients.

All this activity is beginning to pay off. IBM reports that revenue from PC sales was up 50 per cent in 1993. On a corporate level the company reported a \$50 million profit in 1993, before tax and abnormals, up \$119 million on 1992. Australian turnover was \$1.6 billion, an increase of 21 per cent on 1992, including a 10 per cent growth in domestic revenue and a 26 per cent growth in export revenue.

IBM has, since 1986, a production plant at Wangaratta which came close to closure during the restructuring program. Today, the future looks brighter with 1993 production (for IBM and other companies) up 50 per cent on the previous year.

IBM now claims to be well placed to meet the anticipated increase in demand for client server and open system solutions and has established an outsourcing unit to capitalise on this growing trend.

IBM was represented in our sample by 172 end users, accounting for 3.7 per cent of the sample. This response confirms the company's PC fortunes have changed. In APC's first Service and Reliability Survey in 1991 IBM users accounted for 7.5 per cent of the sample; no other vendor had a larger representation. By 1992, the proportion of IBM users had fallen to 6.7 per cent. This indicator of sales performance bottomed last year when IBM users accounted for just 2.4 per cent of the sample.

Despite the dramatic increase in the number sold, the IBM PCs included in our survey did not tend to be younger than average. End users reported their PCs had been in use for an average of just over two years (24.4), over two months longer than the overall average.

Overall, IBM's results were slightly disappointing, with our Five Point Index calculating a score of 7.7, 0.2 below average. This score was sufficiently weak to rank IBM among the bottom five vendors.

It should be highlighted that IBM, like Compaq, has stratified its PC range. In addition to the high-quality, high-margin machines (PS/2 series), IBM produces a low-cost range for retail outlets (PS/1) and a midrange line (PS/ValuePoint). An analysis by model has not been conducted for this report and therefore it is not possible to verify if user experiences are related to their dollar investment.

As in previous years, IBM users rated the overall reliability of their machines in line with the overall average. This year, users awarded 8.6 points, exactly the same

as the average. In the first Service and Reliability survey, conducted in 1991, end users awarded 8.4 points and this increased to 8.7 in 1992 and 8.8 in 1993.

This year, the brand loyalty indicator also fell in the average range with just over four out of five users of IBM PCs (82.6 per cent) saying they would buy again, compared with 81.4 per cent of the overall sample. This score represents a significant improvement on last year when only just over two thirds of the IBM users surveyed (68.6 per cent) said they would buy again from the same vendor.

The 1993 brand loyalty score would appear to be somewhat anomalous with 81 per cent of IBM users participating in the 1992 study saying they would buy again, and 80.4 per cent of the 1991 sample gave this response. Our follow-up research last year revealed that price was a major factor in the relatively low brand loyalty score, and IBM has obviously succeeded in addressing this issue by introducing product differentiation across its PC range.

Just under four out of 10 IBM users (39 per cent) reported experiencing at least one difficulty with their machine since purchase, and this was below the overall average of 47.6 per cent. Demand for product support was also slightly below average with just over six out of 10 IBM users (62.2 per cent) saying they had sought assistance, compared with exactly two thirds of the overall sample.

The IBM users who had experienced the after-sales support services available to them were generally not as impressed with these services as they were with the products themselves. When asked to gauge the ease with which they had obtained assistance, IBM users awarded just 7.3 points, half a point below average. However, this score was up on the 6.7 points awarded last year and more in line with the score of 7.6 awarded in 1992.

Product support satisfaction was rated at 7.1, 0.3 below average, but again up on the 6.2 awarded last year. In 1992, IBM users awarded 7.2 for this attribute.

Repair service satisfaction was rated at 7.2, over half a point behind the average. Interestingly, this score has not changed substantially over the years — 7.1 last year and 7.3 in 1992. End users reported their PCs had been out of action for an average of 2.9 days during the last year, in line with the overall average of three days.

We received sufficient response from IBM users to look at the performance of machines by processor type. The scores awarded to the 386SX and 486DX-based machines were in line with IBM's overall averages. Scores awarded for the 386DX and 486SX-based machines were significantly different from IBM's averages.

User rated the reliability of their 386DX machines at 9.5, nearly a point above IBM's average overall reliability score. However, those users who had experienced a problem and needed assistance were less impressed. The ease with which support was obtained was rated at just 6.1, 1.2 points below IBM's average score. Satisfaction with product support was not, however, significantly down on the overall average with 386DX users awarding 6.8 points against the overall average of 7.1.

The poor product support did not affect the reliability score, but devastated the brand loyalty rating. Just under seven out of 10 386DX users (69.2 per cent) said they would buy another PC from IBM, well below the overall loyalty rating of 82.6 per cent.

Conversely, the users of IBM PCs based on the 486SX processor reported relative ease with obtaining product support and awarded 8.3 points, against IBM's overall average of 7.3. Satisfaction with the support received was rated at 7.8, up from the company's average of 7.1. Despite the fact the overall reliability of these machines was not rated significantly above IBM's average, the positive product support experiences were reflected in a higher brand loyalty rating, 91.5 per cent compared with 82.6 per cent.

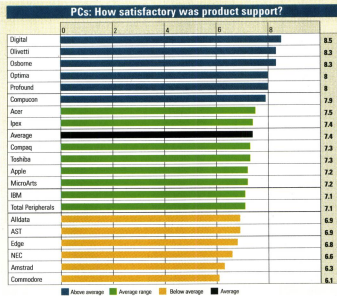
Overall, IBM has obviously turned the corner. Last year's results were pretty dismal, not only in terms of the response rate but also the scores awarded for after-sales support. As the new independently established PC division finds its feet, IBM's overall performance can be expected to improve significantly over the next year.

IPEX

FIVE
POINT
INDEX

8 IpeX Information Technology Group was established in Australia in 1982. The group now consists of 10 specialist divisions spreading across the IT industry. Turnover has reached \$100 million, and the company has branches in all major cities in Australia.

IpeX now ranks in the top 10 PC vendors by dollar value, with IDC estimating the company achieved revenue of \$53 million in the 1993 financial year, up from \$41 million the previous year. The company has introduced a Service and Support



In line with our 1992 and 1993 surveys users awarded an average of 7.4 points to express their satisfaction with product support. Six vendors were awarded scores significantly above average, the same number as last year. Osborne and Profound featured in the above average range for the third consecutive survey, while Compucon featured for the second time (the company was not included in our 1992 results).

Programme which allows clients to choose the level of support most appropriate to their needs.

IpeX has focused on system integration and testing and its efforts have been rewarded by Novell authorising its test centre, the only company outside the US to achieve this status.

This Melbourne-based organisation assembles PC systems in Bainsdale, Victoria, and has achieved AS3902 quality accreditation. IpeX concentrates on volume sales to the corporate and government markets.

IpeX PCs are backed by a three-year parts and labour warranty with free technical support over the phone. A fax-back service is also offered.

In a misguided attempt at boosting the response rate to the survey, IpeX distributed copies of the Service and Reliability questionnaire to clients. Completed questionnaires were then returned to IpeX before being passed on to us. Our checking procedures (and the assistance of a disillusioned IpeX client) helped us track down these solicited responses and the questionnaires were eliminated from our analysis.

IpeX was represented in our sample by 50 end users, up from 30 last year. Overall, the company's performance was in line with the average, with our five point index awarding a score of 8 points, 0.1 above the overall average. IpeX was ranked right in the middle (equal 11th) of the 20 companies included in our PC section.

All the major scores awarded fell in the

average range and, as discussed in detail in the Methodology section, average results imply a perfectly acceptable standard in this survey.

The overall reliability of the IpeX PCs included in our analysis was rated at 8.5, an insignificant 0.1 behind the overall average. Since the Service and Reliability Survey started in 1991 IpeX PCs have been rated at 8.1, 8.8 (in 1992) and 8.3 (last year).

The 1992 survey yielded the best results for IpeX. Nine out of 10 respondents (90.7 per cent) said they would buy again from IpeX, well up on the 83.9 per cent who gave this response in 1991. Last year, only four out of five respondents said they would stay brand loyal and this proportion appears to have stabilised with 84 per cent saying they would buy again this year. On average, 81.4 per cent of the participants in this year's survey said they would buy again from the same vendor.

Just over four out of 10 users (42 per cent) reported experiencing at least one difficulty with their PC since purchase. Overall, nearly half the sample (47.6 per cent) gave this response. This below average tendency to experience a problem was reflected in a below average demand for product support. Less than six out of 10 users (58 per cent) had sought assistance compared with the overall average of two out of three users.

When asked to rate the ease with which product support had been obtained, IpeX users awarded 7.7 points, just 0.1 short of the overall average. The result is a disappointment for this Australian assembler as previous surveys had revealed a positive trend. In 1991, end users awarded a score of 8.1 and this increased to 8.3 in 1992, and 8.6 in 1993.

Similarly, satisfaction with product support provided would appear to have declined. For the three surveys between 1991 and 1993 end users awarded scores of either 7.9 or 8 for this attribute. This year, IpeX's product support was rated at just 7.4, exactly in line with the overall average recorded by the survey.

Repair service satisfaction is, on the other hand, continuing to increase with end users awarding 7.3 in 1991, 7.5 in 1992 and 7.8 this year. The score awarded this year was exactly in line with the overall average. IpeX users reported their machines had only been unusable for an average of 1.4 days — just under half the

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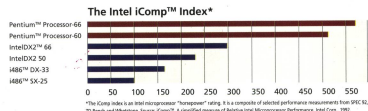
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- BTC 7939 101 Key Enhanced Keyboard
- 5 Year Warranty Plan - 2/3/5 Years Parts

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overall average downtime recorded by the survey (three days).

The problem faced by Ipex is similar to that faced by many businesses enjoying a period of rapid expansion, looking after existing clients. As the client base expands, existing after-sales support resources will be stretched. Longterm success, for any company facing this problem, depends on its ability to allocate sufficient resources to keep existing customers happy. Word of mouth is the best source of advertising and this relies on established clients.

MICROARTS

FIVE POINT INDEX
8.1

RANK 9th

Melbourne-based MicroArts opened for business in Australia in 1986 and now employs 40 staff and has interstate offices. Components from all over the world are used to supply the local assembly line. The company is now diversifying into the communications and networking markets.

The company concentrates on the Melbourne market and is strong in the corporate and government segments. IDC ranked MicroArts just outside the top 10 PC vendors in Australia by dollar value at the end of 1993. Revenue for PC systems during the 1993 financial year was estimated at \$40 million, up from \$18 million the previous year.

MicroArts PCs are supplied with either a two or five-year parts warranty and a five-year labour warranty. Free technical support is available around the clock by phone, supported by a fax-back service and both public and private bulletin board services.

MicroArts prides itself on using the best quality components to build high-quality PCs that, typically, command a premium in the market. It is then slightly disappointing to report that end users returned an average score for this Australian assembler in response to this year's Service and Reliability Survey. Overall, our Five Point Index awarded MicroArts a score of 8.1, just 0.1 above the overall average and sufficient to rank the vendor equal ninth.

It must be highlighted that average results in this survey do not imply anything inferior. As discussed in the Methodology section, average means the vendor supplies a perfectly acceptable product backed by adequate after-sales support.

This year, we heard from

118 MicroArts users, making up 2.5 per cent of the installed base surveyed. We have only received sufficient replies to include MicroArts in our published results since 1992. In that year, MicroArts users accounted for 1.1 per cent of the sample and this increased to 1.9 per cent last year.

As would be expected, given the increase in number of new PCs being added to the installed base, MicroArts PCs tended to be slightly younger than the overall average. MicroArts users reported their machines had been in use for an average of 15.8 months compared with the overall survey average of 22 months.

When end users were asked to rate the overall reliability of their MicroArts PCs they awarded a score of 8.6, exactly in line with the overall average recorded by the survey. This score exactly bisects those achieved in our earlier survey — 8.4 last year and 8.8 in our 1992 survey.

MicroArts brand loyalty rating just squeezed into the above average range with 85.6 per cent of users saying they would buy another PC from the same vendor, compared with an overall average of 81.4 per cent. In both previous surveys just under nine out of 10 users said they would buy from MicroArts again.

End users reported they were significantly more likely than average to have encountered at least one problem with their PC since purchase. Nearly six out of 10 users (58.5 per cent) reported experiencing a difficulty compared with just under half (47.6 per cent) of the overall sample.

As would be expected from such a high incidence of problems, MicroArts users were significantly more likely than average

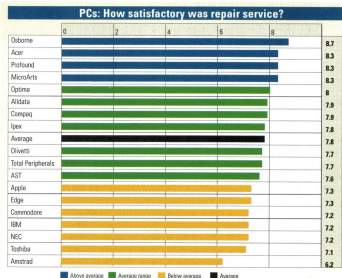
to have sought assistance. In fact, over four out of five users (83.1 per cent) said they had contacted product support, well up on the average of two out of three users who gave this response. No other vendor had to cope with such a proportionately large demand for product support. Both scores — demand for product support and proportion of users experiencing difficulty — were consistent with those of our two previous surveys.

Despite the relatively high demand for support, MicroArts users rated the ease with which they had obtained product support at 7.7, an insignificant 0.1 below the overall average. However, this score was down on the 8.2 awarded in our previous two surveys.

Satisfaction with product support received was rated at 7.2, just 0.2 behind the overall average. In 1992, end users rated the product support given to them for their MicroArts PCs at 7.1 and that score increased to 7.6 the following year.

Repair service satisfaction was rated at 8.3, half a point above average. Interestingly, this score was up on both the 7.7 awarded in 1993 and 7.9 in 1992. End users reported their PCs had been out of action for an average of 2.7 days during the last year, in line with the overall average of three days.

MicroArts has been quoted as saying that 1994 will be a year of consolidation. Efforts are to be focused on servicing the installed base. This strategy is commendable and, if successful, should put the company in place for an outstanding performance in next year's survey and prepare it for another period of growth.



Repair service satisfaction is on the increase. In our first Service and Reliability Survey end users awarded an average of just 6.8 points to express their satisfaction with the repair services they had received. By 1992, that average had increased to 7.1 and was followed by 7.3 last year. This year the overall average increased significantly to 7.8

NEC

FIVE POINT INDEX
7.7

RANK EQUAL 10th

NEC Information Systems has been established in Australia for 10 years as a sales and marketing subsidiary handling computer products only — monitors are handled by NEC Home Electronics division.

In 1990, consolidated revenue for the entire international group was in excess of \$US21 billion with 44 per cent derived from the sale of computers and industrial electronic systems, and 25 per cent from communication systems and equipment.

In the last year, the company has been riding high on the success of the Versa series

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5	WESTERN DIGITAL	7=	10						
6	MICROPOLIS	9	3=						
7	EXABYTE CORPORATION	10	2						
8	O R COMPUTER SYSTEM	5=	3=						
9	SONY	5=	8=						
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of notebooks. In addition to wide critical acclaim (including APC's Product of the Year award) NEC was able to capitalise on the worldwide shortage of TFT active colour matrix screens. While other vendors had to warn prospects of a six week wait, NEC could deliver on the spot.

NEC/ISA has not become complacent and the company's first strategic objective now is to become Australia's leading high-technology networking company. However, the recent past has been tough for NEC, and IDC estimates that sales from PC systems in Australia during the 1993 financial year were \$36 million, down about eight per cent on the previous year.

NEC PCs are supplied with a one-year parts and labour warranty with an option to extend for an additional two years. Fee-based maintenance contracts can be negotiated after this time. Free technical support is provided over the phone (008 number) and by private bulletin board. A quarterly newsletter containing product and technical information is also available.

We heard from 86 NEC PC users in response to this year's Service and Reliability Survey, making up 1.8 per cent of the entire sample. Back in 1991, NEC PC users made up 5.3 per cent of the installed base surveyed; by 1992 this proportion had decreased to 3.7 per cent and reached 1.9 per cent last year. This year's result does seem to suggest that the company have succeeded in "stopping the rot".

Overall NEC's PCs were rated in the average range with our five point index, awarding a score of 7.7, 0.3 below the overall average. NEC finished the survey ranked equal 16th, along with IBM.

End users awarded an impressive 9.1 for the overall reliability of their machines, half a point above the overall average recorded by the survey. This result continued a slight positive trend for the company, with scores increasing from 8.7 in 1991 to 8.9 in 1992 and 9.0 in 1993.

Brand loyalty would appear to be following a similar trend. The 1991 score was relatively good, 78.8 per cent, but this was followed by 72.9 per cent in 1992 and 73.1 per cent in 1993. This year, 82.6 per cent of users said they would buy again from NEC, only just over two per cent below the overall average brand loyalty score. The brand loyalty score remains low compared with the score achieved for overall reliability.

Four out of 10 users (40.7 per cent) said they had encountered at least one problem with their PC since purchase and this was below the overall average of 47.6 per cent. Demand for product support was similarly below average with six out of 10 users (59.3 per cent) seeking assistance compared with exactly two thirds of the entire sample.

End users who had cause to seek after-

sales support reported their experiences did not match the standards associated with attributes related to the products themselves, and probably accounts for the discrepancy between the brand loyalty and overall reliability scores. Users rated the ease with which product support had been obtained at 7.3, half a point below the overall average. This score was consistent with previous findings: 7.1 in 1991, 7.2 the following year and 7.5 in 1993.

Satisfaction with product support received was rated at 6.6, 0.8 behind the overall average and sufficiently weak enough to rank NEC among the bottom three vendors. In fact, only Amstrad and Commodore (both with well publicised problems) received lower scores. This result marks the end of a positive trend for NEC. In 1991, users awarded just 6.3 points to express their satisfaction with product support and this increased to 6.9 in 1992 and reached 7 last year.

Repair service satisfaction fared slightly better with a score of 7.2. This result was still 0.6 behind the overall average and still sufficiently weak to rank NEC among the bottom three providers of repair services. This result does, however, represent a significant improvement on previous years when end users awarded 6.3 in 1991, 6.8 in 1992 and 6.4 last year.

On average, NEC machines had been out of action for an average of 2.3 days during the past year, below the overall average down time recorded, three days.

Users of NEC PCs based on the 486DX processor reported slightly better experiences in obtaining product support and awarded 7.8 points against the company's average of 7.3. Nearly nine out of 10 486DX users (88.6 per cent) said they would buy another NEC PC, up on the company's average loyalty rating of 82.6 per cent.

For the fourth consecutive year overall end user feedback to NEC/ISA is, "improve after-sales support".

OLIVETTI

FIVE
POINT
INDEX

RANK EQUAL TO

Olivetti has been in Australia since 1952; the Italian-based parent company is one of Europe's largest IT companies. In 1992, turnover reached \$7.6 billion. As with other major players in the industry, Olivetti found IT in the '90s a difficult and rapidly-evolving market.

As the company struggled to adapt to changes the bean counters moved in and Olivetti appointed a receiver and successfully attempted to trade out of bankruptcy. The success of the group has, to a large extent, depended on its willingness to form strategic alliances (with Digital,

AT&T, Canon, Intel, Microsoft, NetFRAME Systems, Novell, Pyramid Technology, Seiko and Toshiba among others). Olivetti supplies products to OEMs such as Digital, Fujitsu and Citizen. Olivetti PCs are supplied with a three-year parts and labour warranty backed by free technical support available by telephone.

The local division employees 260 people with sales and technical representation in all states. Complete IT solutions are sold to major accounts within the selected areas of specialisation — finance, government and health. A network of resellers has been established to service a wide variety of niche markets within these market segments and the SOHO and education markets. Harvey Norman and Chandlers have been recruited to take Olivetti to the high street.

Olivetti anticipates achieving AS3902 certification by the third quarter of 1994, which will open up the government market to the company.

IDC estimates PC revenue fell nearly 17 per cent during the 1993 financial year. Olivetti's revenue from PCs was estimated at \$11 million, ranking the company outside the top 30 PC suppliers in Australia.

The problems faced by the PC range are reflected in the response rates to our surveys. In 1991, when we conducted our first Service and Reliability Survey, Olivetti users accounted for three per cent of the sample. By 1992, that proportion decreased to 1.8 per cent, followed by one per cent last year. This year, we heard from just 39 users of Olivetti machines, making up 0.8 per cent of the sample. This small sample size should be considered when interpreting results as only a narrow band of end users' experiences are represented.

As would be expected with a declining market share the Olivetti PCs included in our analysis tended to older than average. End users reported their Olivetti machines were, on average, 28.9 months old, nearly seven months older than the overall average. However, a closer inspection revealed the majority of the machines were relatively young (and included a lot of portables) with a small proportion of very old PCs boosting the average age.

Olivetti was one of only six PC vendors to achieve an overall ranking rated above average, with a score of 8.5. This represents a significant improvement in performance over previous years.

Olivetti users rated their PCs at 9.2 for overall reliability, ranking the company second only to Digital, who achieved an outstanding 9.4. This result marks a quantum leap for Olivetti. In 1991, end users awarded just 7.7 for this same attribute. By 1992 the score was 8.1 and last year end users continued the slight positive trend

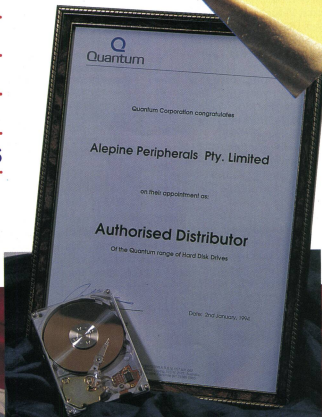
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and awarded 8.3. This year's score is nearly a full point ahead of last year's results, an incredible achievement.

The overall improvement in Olivetti's performance was reflected in the brand loyalty indicator. Virtually nine out of 10 users (89.7 per cent) said they would buy another Olivetti machine, over eight per cent above average. In our two previous surveys, only about two thirds of Olivetti users said they would buy another PC from this vendor. In our first survey about three quarters of users (73.4 per cent) gave this response. Another stunning improvement in performance for Olivetti.

Only three out of 10 users (30.8 per cent) had experienced a problem with their PC since purchase, and only just over half (53.8 per cent) had cause to contact product support. As would be expected, from such a high reliability rating, both scores were better than average (47.6 per cent and 66.6 per cent respectively).

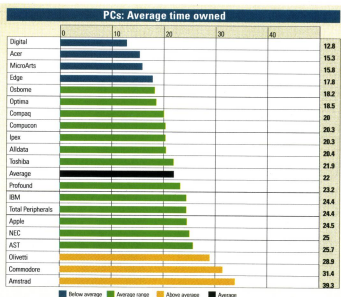
The ease with which product support was obtained was rated at 8.2, 0.4 above average. In our first two surveys Olivetti users did not report problems with obtaining assistance, awarding scores of 7.6 in 1991 and 7.9 the following year. Last year, however, Olivetti users awarded a below average 7 points.

Product support satisfaction was rated at 8.3, nearly a point above average, and the second highest score achieved in this year's survey. Again, the result represents a remarkable turnaround for the company. Last year, the company was ranked dead last for provision of these services with a score of 5.7. In 1992, users awarded 6.5, which represented a significant improvement on the 5.9 awarded in 1991.

Interestingly, repair service satisfaction was rated at 7.7, 0.1 below average. However, this result still represents a significant improvement on previous years: in both 1991 and '92 end users awarded 6.7 points to express their satisfaction with repair services.

On average, Olivetti machines were reported to be out of action for an average of just 0.7 days during the past year, significantly below the overall average of three days.

Olivetti has achieved an incredible improvement in performance in this year's survey. In fact, the performance was so outstanding it attracted interest from our



The average age of the PCs included in our survey increased slightly from 20.4 months last year to 22 months this year. It will be next year before we can firmly establish if this is a genuine market trend. It is possible that the general improvement in after sales support, particularly repair services, is allowing users to run the same machine for longer. Another factor could be that the majority of users now have sufficient processing power to meet their current needs, resulting in upgrade delays

verification procedures, and passed. The company would appear to have sorted out after-sales support problems reported in previous surveys. This coupled with an impressive new product range (including some enviable portable machines) should see the company continue to improve, not only in this survey but in market share as well.

OCT/OPTIMA

FIVE POINT INDEX

8.7

RANK

3rd

Optima Computer Technology is a fully Australian-owned company incorporated in 1989. During the 1993 financial year turnover reached \$40 million, 1992 revenues represented an increase of 155 per cent over the previous year. The company has about 80 employees with headquarters (and assembly plant) in Sydney and branch offices in Brisbane and Melbourne.

IDC estimates Optima achieved a four per cent market share in 1992 (up from three per cent in 1991), sufficient to rank this relatively small Australian company up with the likes of Compaq (three per cent) and NEC (four per cent). PC revenue for the 1993 financial year was estimated at nearly \$36 million, up from \$29 million the previous year.

Optima has been audited and recommended for accreditation for the Australian Quality Standards AS3902. This will open up the government market for this corporate sector orientated vendor.

A three-year, systems only, parts and labour warranty (with no onsite options) is offered, backed by a free technical support line and bulletin board service. Repairs and service are carried out by the vendor.

Optima made its debut in the 1992 Service and Reliability Survey when users accounted for two per cent of the population surveyed. Last year, the company enjoyed a dramatic increase with responses totalling 4.7 per cent of the sample. This year, the installed base appears to be stabilising with 227 Optima users participating in our research representing 4.9 per cent of respondents.

Despite the decrease in rate of growth, the Optima PC included in our analysis tended to be slightly younger than average. Users reported their PCs had been in use for an average of just 18.5 months, 3.5 below the overall average.

Not only was Optima the third best represented vendor in our sample, but the company achieved the third highest five point index score. Users an average of 8.7 points to the important attributes measured by our survey, 0.8 above the overall average awarded by all 4672 participants in our research.

End users awarded Optima 9.2 points for the critical attribute overall reliability, the second best score awarded in the survey. In 1992 users awarded 8.9 for this same attribute and, last year, the score increased to nine.

Nearly 19 out of 20 Optima users said they would buy another PC from this vendor (94.3 per cent). This brand loyalty rating was an insignificant 0.3 per cent below the highest recorded in the survey. The rating was in line with that reported in previous surveys: 95.6 per cent in 1992 and 92.1 per cent last year.

Just under four out of 10 users (38.8 per cent) reported experiencing at least one difficulty with their PC since purchase, well below the overall average of nearly half (47.6 per cent). This low incidence of problems was not, however, reflected in the demand for product support. In line with the overall average nearly two thirds of Optima users (64.8 per cent) had sought assistance. These findings are consistent with those reported in last year's survey. The apparent inconsistency between the two results could be accounted for by a number of factors. The most likely explanation is a shortcoming in the accompanying documentation, although this is only a hypothesis.

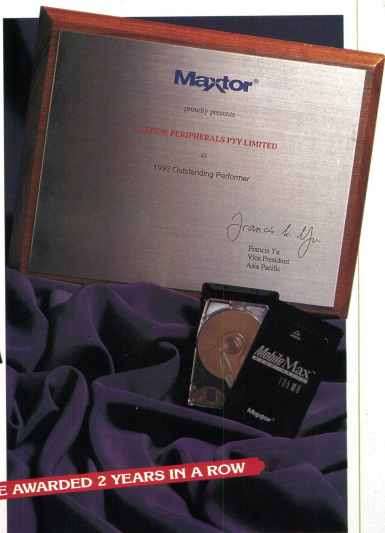
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When users were asked to rate the ease with which product support had been obtained they awarded a score of 8.7, nearly a point above average. This finding is consistent with the score awarded in 1992 of 8.8 and well up on the 8.2 awarded last year.

Product support satisfaction was rated at 8 points, over half a point above average. Again this result was consistent with the 7.9 awarded in 1992 and up on the 7.6 awarded last year.

Repair service satisfaction was also rated at 8 points. This score was consistent with those awarded in both previous surveys, 7.5 last year and 7.4 in 1992. Optima PCs had been out of action for an average of 1.9 days during the last year, well below the overall average of three days.

We received significant response from Optima users to look at results by processor type. All the scores awarded by 386DX users were in line with the company's overall averages. Users of 386SX and 486SX-based machines awarded higher than average scores to express their satisfaction with product support, 8.7 and 8.4 respectively. In the case of 486SX users this higher rating was reflected in the brand loyalty indicator, with all users saying they would buy again from Optima against the company's average of 94.3 per cent.

It would appear that the 1992 product support scores reflected a problem encountered by many vendors in the industry. A period of rapid expansion places enormous pressure on any organisation's cashflow and many vendors experience great difficulty in maintaining after-sales support for existing clients during this phase. Optima would appear to have successfully consolidated its position and both product support scores are in the above average range.

Only the score given to repair services failed to reach the above average range in this year's survey. Should Optima choose to address this issue it will undoubtedly be a contender for the top slot in next year's survey. Optima may also like to investigate (probably from its own records) why demand for product support is disproportionately high (given the low incidence of problems). Such an analysis may point to easily rectified explanations which would save the company a small fortune.

OSBORNE

**FIVE
POINT
INDEX**

8.8

RANK 2nd

A crucial part of the Osborne success story has been the company's commitment to after-sales service, which it supplies direct to the client. This relatively small fully-Australian-owned company is,

arguably, leading the world in after-sales support innovations.

The single most important element of Osborne's commitment to service must surely be the option to back every system with a five year onsite parts and maintenance warranty.

When Osborne introduced this warranty many in the industry believed the accumulated liability would send the company bankrupt — a plethora of dirty tricks and whisper campaigns were generated to assist with this demise.

Now, three years after the introduction of this after-sales innovation, Osborne is going from strength to strength. Some competitors still fight dirty, but the simple fact remains: none (with the exception of Profound) has matched the Osborne warranty.

Osborne assembles its PCs locally and operates a strict cash-with-order policy that has allowed the company to grow dramatically, unaffected by the constraints normally imposed by the need to raise working capital. The company has arranged favourable terms with component suppliers, most of whom have been persuaded to share in Osborne's liability and back their individual components with extended warranties.

Since the Service and Reliability survey began in 1991 end users have consistently awarded the Osborne products excellent marks across all the attributes surveyed. The high quality of the end product has undoubtedly been a major factor in the company's ability to continue to offer such a generous warranty.

Another factor that contributes to the continued success of Osborne is the fact that the organisation has a high commitment to rural Australia; in fact, the company built up market share away from the metropolitan areas before hitting the cities. Osborne, almost certainly, has by far more regional branches than any other PC company operating in Australia, making delivery on the promise of free onsite service more economically viable.

In addition to the telephone technical support line Osborne offers, a free bulletin board service and is installing a fax back service. More innovatively, the company has recently launched another after-sales initiative which has sent the competition reeling. With any Osborne system the purchaser is now given the option of 'future proofing' their investment. Rolling upgrades of hardware and software are bundled, enabling end users to double the RAM and disk capacity of their machines and update their chosen software suites during the first five years of ownership.

In an attempt to protect its image as the 'enfant terrible' of the PC industry, Osborne recently made competitors'

products available for comparative testing in its showrooms.

End users can now choose their preferred software suite and Osborne will supply and install the software and competitively bundle the cost with the hardware. Osborne has recently launched an aggressive attack on the software distribution market, offering to beat any written quote for the major software suites.

IDC estimates Osborne's revenue from PCs was \$146.5 million in the 1993 financial year, up 43 per cent from \$102 million the previous year. The company is now challenging Apple for the number one position as Australia's largest PC vendor. MD John Linton's ambitious plans do not end there; he wants market domination with a combined turnover for the company of \$1 billion by the end of the decade.

This year, Osborne users represented 8.4 per cent of the user base surveyed. The continued sales success of the company is clearly illustrated by this result. Last year, Osborne users represented 7.6 per cent of the sample, up from 4.5 per cent in 1992 and 3.1 per cent in our first survey in 1991. As would be expected from such a strong recent performance, Osborne PCs tended to be slightly younger than average. End users reported their PCs had been in use for an average of 18.2 months, nearly four months below the overall average age.

In line with our previous survey results, Osborne's performance was outstanding, with our five point indicator awarding the company a score of 8.8 — an insignificant 0.1 off the highest index (awarded to Digital).

The overall reliability of Osborne PCs was rated at nine points, right at the top of the average range. This score was consistent with that awarded in the previous two surveys: 8.8 in 1992 and 9.1 in 1993. Back in 1991 the company was only awarded 7.9 for this critical attribute.

The results awarded by Osborne users to express their satisfaction with after-sales support have always been relatively higher than those awarded for reliability.

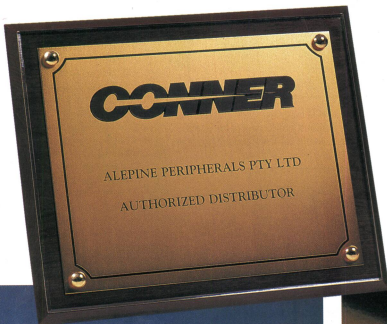
Over nine out of 10 Osborne users (92.9 per cent) said they would buy another PC from the same vendor. Overall, four out of five users (81.4 per cent) said they would stay with their current brand. Osborne's score was the fifth highest brand loyalty rating recorded by the survey. This score is entirely consistent with our previous findings, with 95.5 per cent saying they would buy from Osborne again last year, compared with 92.8 per cent who gave this response in both our 1991 and 1992 surveys.

In line with the overall average recorded by the survey, nearly half the Osborne sample (45.7 per cent) reported they had experienced at least one difficulty

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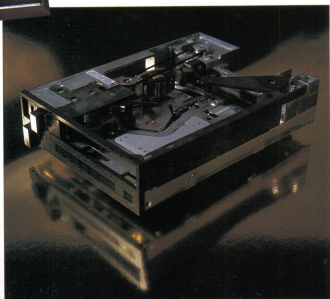
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with their PC since purchase. A slightly higher than average proportion of users had gone on to contact product support. Nearly three quarters of Osborne users (76.3 per cent) had made contact with support, compared with exactly two thirds of the sample overall.

The apparent conflict in these scores (which are consistent with previous years) could be explained by, among other things, end users experiencing problems with installation or incomplete or unclear documentation.

When asked to express the ease with which product support was obtained, end users awarded 8.7 points, nearly a point ahead of the overall average, 7.8. This score is consistent with the findings of our two previous surveys (both 8.6), up a full point on the 1991 finding.

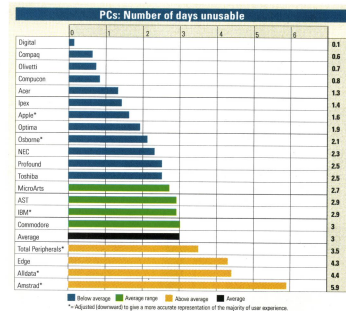
Product support satisfaction was rated at 8.3, nearly a point above the overall average — the second highest score awarded in the survey. Last year, the company achieved 8.4 for this same attribute compared with 8.1 in 1992 and 7.5 in 1991.

There is a word of warning for Osborne: when end users were asked to specify problems encountered in obtaining support, Osborne respondents were twice as likely to complain about slow service. In fact, over seven per cent of the Osborne sample made a point of mentioning this.

When Osborne users were asked to rate repair services provided, they awarded 8.7 points. No other vendor achieved a higher score. In fact, Osborne led the rest of the pack by nearly half a point. This score represents a significant improvement on that awarded in our two previous surveys (8.1 in 1993 and 8.2 in 1992). Back in 1991, Osborne only attracted a score of seven for the provision of repair services.

Osborne users reported their PCs had been out of action for an average of 2.1 days, well below the overall average of three days.

We received sufficient response from Osborne users to look at the scores awarded to machines based on four different processors. All the scores awarded by users of machines based on 386DX, 486SX and 486DX processors were in line with the company's overall averages. Among the 386SX users awarded similar scores for most attributes, however, the brand loyalty among this group of users



The number of days the average PC was unusable in the 12 months prior to survey has remained static at three days for the last three surveys. Only the users of machines made by four vendors reported significantly longer than average downtimes. Amstrad ranked dead last for the second year running, with users reporting an average of 5.9 days lost, against 5.4 last year.

was even higher. A massive 96.7 per cent of users said they would buy again from Osborne.

It would probably be worth the company's investment to investigate the cause of the relatively high demand for product support. If the cause is relatively minor (incomplete or incomprehensible documentation, for example) the company could save significantly by fixing the problem and reducing the investment in after sales support. This one result should not be allowed to detract from Osborne's outstanding overall performance.

PROFOUND

FIVE POINT INDEX

8.5

RANK EQUAL 9th

Melbourne-based Profound struggled to maintain its PC revenue in the 1993 financial year, according to IDC. Overall, PC revenue was estimated at \$30 million, about the same as the previous year.

Profound has moved against the overall trend and pulled out of the high street, closing most of its Blue Chip retail outlets. The government and direct and OEM markets became the company's main focus.

Profound PCs are supplied with a five-year parts and labour warranty, backed by free technical support by phone and fax-back service. The warranty can be upgraded to onsite for just \$75. Profound is the only major PC vendor operating in Australia to have matched the Osborne five-year parts and labour warranty.

Profound made its debut in the Service and Reliability in 1992 when users accounted for just 0.7 per cent of the sample. Last year, Profound users accounted for 1.5 per cent of the sample. This year the company's struggle to maintain sales volumes is illustrated by the fact Profound users accounted for 1.3 per cent of the 4672 completed questionnaires received.

Overall, the company's performance was impressive with our five point index awarding a score of 8.5, over half a point above the average score and sufficient to rank Profound equal fifth.

When asked to rate the overall reliability of their PCs end users awarded Profound a score of 8.7, just 0.1 above the overall average. This was consistent with the score of 8.6, awarded in 1991, and 8.9, awarded last year.

Well over four out of five users (86.4 per cent) said they would buy another PC from Profound, sufficient to rank the vendor in the above-average group. Again, these results are remarkably consistent with previous findings: 87.1 per cent in 1992 and 88.5 per cent last year.

Nearly half (49.2 per cent) of the Profound users participating in our research reported experiencing at least one problem with their PC since purchase, and this was almost exactly in line with the overall average (47.6 per cent). Similarly, demand for product support was average with 67.8 per cent of Profound users saying they had sought assistance, compared with exactly two thirds of the overall sample.

The ease with which product support was obtained was rated at 8.8, a whole point above average and the third highest score awarded in the survey. Once again, this result (and demand for support) was consistent with previous years, 8.7 in 1993 and 8.5 in 1992.

Product support satisfaction was rated at exactly eight points, over half a point ahead of the average. Profound was ranked equal fourth for the provision of these services, with a score exactly the same as that awarded last year.

Repair service satisfaction was rated at 8.3 points, half a point ahead of the average and sufficient to rank Profound equal fourth. Last year, users awarded 7.8 for this same attribute compared with 8.1 the previous year.

Sufficient replies were received from Profound users to enable us to look at the response from 486DX users in isolation. A

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disturbing trend emerged among the ratings for these machines. The overall reliability of the 486DX-based PCs was rated at 8.1, 0.6 below the vendor's overall score for this critical attribute. In addition, 486DX users were less impressed with product support, awarding just 8.3 to express the ease with which it had been obtained and 7.6 for their satisfaction with the support provided. Both scores were about half a point below the vendor's average.

These slightly lower ratings were reflected in the brand loyalty score with only 78.6 per cent of 486DX users saying they would buy from the vendor again, compared with 86.4 per cent of all Profound users. These scores are down sufficiently to warrant investigation by the vendor.

It would appear the majority of responsibility for the future success or failure of this vendor rests squarely with the marketing department. Profound has, over the last three years, been proven to supply good product backed by excellent after-sales support. Although the company professes to avoid industry hype it could well be that this is exactly what Profound needs!

TOSHIBA

FIVE
POINT
INDEX

8.1

RANK EQUAL 136

This mobile computing specialist still enjoys the lion's share of the portable market despite fierce competition from technological innovators (such as NEC's UltraLite Versa and IBM ThinkPads) and cut-price clone vendors producing increasingly sophisticated machines.

IDC, in December 1993, estimated Toshiba held 30 per cent of the mobile market, down from 50 per cent plus in the early '90s. But during this time, the mobile market has exploded and Toshiba has been forced to cut margins affecting the bottom line. IDC estimates revenue from PC systems fell to \$65 million in the 1993 financial year, down from \$70 million in 1992.

Toshiba (Australia) was established in 1975 and now has over 60 authorised service centres throughout Australia and New Zealand. The company recently launched its first subnotebook following a period where the giant appeared to be losing its edge, relying on product differentiation based on peripheral attributes (such as insurance schemes) rather than leading the field in technological advancement.

Whether Toshiba can hold onto its enviable market share will depend on its continued ability to squeeze margins while protecting its investment in research and development. Toshiba has to be seen to remain the mobile computing innovator.

Entry-level notebooks are supplied with a one-year parts and labour warranty while the premium models are supported for three years. Free technical support is provided through a 008 telephone number and bulletin board service. All after-sales service is handled by the distribution channel.

Toshiba's declining market share is clearly reflected in the response to our survey. Back in 1991, Toshiba users accounted for 4.8 per cent of the sample. By the following year that proportion had decreased to four per cent, followed by 3.2 per cent in 1992. This year, Toshiba users accounted for just 2.1 per cent of the entire sample.

Toshiba performed well in this year's survey, with our Five Point Index awarding a score of 8.1, 0.2 above average. Toshiba was ranked equal ninth out of the 20 vendors included in our published findings, demonstrating the vendor can hold its own against the desktops.

The overall reliability of the Toshiba PCs included in our analysis was rated at 8.9, 0.3 above the overall average. During the last three years, all reliability scores have been in the range of 8.9 to 9.1.

Toshiba users are highly brand loyal, with 94 per cent saying they would buy again from the same vendor, compared with the overall average of 81.4 per cent. Toshiba ranked fourth in the brand loyalty stakes, just 2.6 per cent behind the top score. The company has held onto its enviable brand loyalty score for two years (94.7 per cent last year). In 1992, the score was 91.4 per cent up from 86.4 per cent in 1991.

Four out of 10 users (39 per cent) reported experiencing at least one problem with their PC since purchase, significantly below the overall average of 47.6 per cent. This low incidence of problems was reflected in a correspondingly low demand for product support. Only just over half (53 per cent) of the Toshiba users participating in our survey had sought assistance.

Both the incidence of problems and the demand for product support were in line with the findings of our previous surveys. The ease with which product support was obtained was rated at eight points, 0.2 above the overall average. This was in line with the results obtained in our two previous surveys (7.8 and 8).

Satisfaction with the product support received was rated at 7.3, 0.1 below average. The results from the three previous surveys have all been in the range 6.8 to 7.0.

This year, it was the repair service satisfaction score that brought Toshiba's overall average down. End users awarded just 7.1 points, 0.6 below average. This score is

exactly the same as that awarded last year and marks the end of a positive trend enjoyed by Toshiba since the first survey. In 1991, end users awarded 6.2 for satisfaction with Toshiba's repair services, followed by 6.7 in 1992.

Despite the below-average score awarded for satisfaction with repair services, Toshiba users reported their machines had been out of action for an average of just 2.5 days during the past year, half a day less than average.

Only repair service satisfaction held back Toshiba in this year's survey. Should the vendor choose to take action to address this problem the company should rank in the above overall average performance category in next year's survey.

Toshiba was sufficiently represented in our sample to enable a detailed analysis of results awarded by users of machines based on the 386SX and 486DX processors. Scores awarded to the 386SX machines were in line with the company's overall averages with one exception: users awarded a lower score for overall reliability, 8.4 against 8.9.

Users of Toshiba machines based on the 486DX processor awarded a lower score to express the ease with which they had obtained product support — 7.3 against the company average of eight. These experiences would appear to have affected brand loyalty with just 88.5 per cent of 486DX users saying they would buy from Toshiba again, compared with the overall company rating of 94 per cent.

TOTAL PERIPHERALS

FIVE
POINT
INDEX

7.9

RANK EQUAL 136

Total Peripherals is an Australian company that was founded in 1986 by John and Vicky Teoh. The couple had gained experience of the PC business in Singapore and Malaysia and now head up the second largest Australian-owned PC company (according to IDC).

Revenue from PC systems was estimated by IDC to be \$65 million in the 1993 financial year, up from \$53 million last year, the sixth largest vendor by dollar value. The company is strong in the government and corporate market segments and is unique among the Australian vendors in that it distributes solely through a dealer network.

Total Peripherals has ambitious plans for the future. It has recently made several acquisitions including a networking company, accounting software house and another software house specialising in multimedia applications. The company also has plans to incorporate the PowerPC chipset into a new range of product, marking a deviation from the

Intel camp to the Apple, IBM, Motorola consortium.

IDC predicts the company will specialise in fully-integrated fault tolerant networks, a far more profitable proposition than just selling PCs.

This year, Total Peripherals was represented in our sample by 239 end users, contributing a disappointing 5.1 per cent of the sample. In 1991, the company was included in our first Service and Reliability Survey with users making up 4.2 per cent of the sample. By 1992, this proportion had increased to six per cent and last year Total Peripherals accounted for 6.7 per cent of the population surveyed.

As with previous year's results, Total Peripherals' performance in the Service and Reliability survey can only be described as average. Overall, the company achieved a Five Point Index score of 7.9, exactly in line with the overall average recorded by all 4672 users participating in this year's research. It must be highlighted that average does not mean bad. Any score in the average range indicates a perfectly acceptable performance.

The score awarded for overall reliability was 8.5, an insignificant 0.1 below the overall average. The scores from our three previous surveys have all been in the range 8.3 to 8.6.

Our indicator of brand loyalty was rated as average, with 83.3 per cent (less than two per cent above the overall average) saying they would buy another Total Peripherals PC. This score was exactly the same as that achieved in the 1991 survey but will come as a disappointment to the vendor that has achieved scores just over 87 per cent in the last two surveys.

Total Peripherals' users were slightly more likely than average to have encountered at least one difficulty with their PC since purchase. Well over half of the TP users participating in our research reported a problem (56.1 per cent), compared with only 47.6 per cent of the sample overall. Despite this slightly above-average score, TP would not appear to have to deal with an above average level of demand for product support.

The ease with which product support was obtained was rated at 7.9, just 0.1 above the overall average. This score was exactly the same as that achieved in the 1992 survey but below the 8.3 awarded last year. In 1991, TP users awarded just 7.3 for this same attribute.

Satisfaction with product support was rated at 7.1, 0.3 below the overall average. This score was half a point below that awarded in last year's survey but consistent with those awarded in our first two surveys.

Repair service satisfaction was rated at 7.7, just 0.1 below the overall average. This

result represented a significant improvement on the scores of 7.1 and 6.9 achieved in our two previous surveys. Total Peripherals' PCs had been out of action for an average of 3.5 days, half a day longer than the overall average.

We received sufficient replies from users of PCs made by Total Peripherals to analyse the results by four processors. Overall, the scores awarded in all four categories were in line with the vendor's averages.

Users of 386SX-based machines awarded a slightly lower than average overall reliability rating (8.0 compared with 8.5). Users of 486SX-based machines

recorded a slightly higher brand loyalty rating with 88.6 per cent, saying they would buy again, against TP's average of 83.3 per cent. Conversely, users of 386DX machines were slightly less likely to remain faithful to the company, delivering a loyalty rating of only 78.2 per cent.

As has become the norm, end users awarded Total Peripherals an unremarkable set of results. The company has, however, consistently produced good product and backed it up with a perfectly acceptable level of after-sales support. TP may like to consider the slightly decreased scores awarded for product support as opposed to repair services.▲



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Of the companies still in business Mitac ranked last. Users awarded below average scores for every attribute surveyed with after-sales support rated particularly low. KTX and (as detailed above) Mag failed to attract scores sufficient to rank its overall performance in the average range.

Increased resolution

This year we attempted to increase the level of sophistication used to track the migration of users to higher resolution monitors. Unfortunately, our attempt failed; many users being unable to specify the level of detail required. Our previous findings have shown the market has moved, very dramatically, toward at least the SuperVGA standard.

In 1991, only one in 20 users were using a monitor that matched this standard, by last year the proportion had increased to two out of three. VGA monitors were in use by 10 per cent of the sample in 1991, peaking at 38 per cent in 1992 and declining to 25 per cent last year.

Mono monitors have virtually disappeared. In 1991 a third of the sample did not have colour on their primary machine; by 1992 this proportion fell dramatically to eight per cent. Only three per cent of the sample were using mono last year and this year that proportion fell to two per cent. EGA and CGA have also fallen from favour as the market moves to the GUI environment. Just over half (51 per cent) of the 1991 sample was using either an EGA or VGA monitor, falling to 11 per cent in 1992, six per cent last year and just three per cent this year.

Market swings

As with the PC section, there are relatively few changes to the companies included in our published findings this year. Monitors wearing the EDGE badge disappeared as the vendor now markets monitors under the KTX badge. Mag made its debut in this year's survey as did Olivetti and Shanrock. Mag failed to make an impressive debut, with users awarding a below average Five Point Index. Users of Olivetti monitors rated their experiences above average and Shanrock users ranked their supplier right at the top of the average range.

NEC has dominated the monitor market since it began, but the vendor's enviable position is now under attack. The Japan-



Five Point Index: In response to reader requests we have attempted to summarise the main findings of our monitor research in one chart. We have taken the scores awarded for five major attributes surveyed and calculated an average for each vendor. This chart is only an indicator of overall performance as averages can be misleading.

based company has held on to around 10 per cent of the market for the past three years. However, successful local assemblers (most notably Total Peripherals and Osborne) are now beginning to catch up due to the success of their system sales.

KTX was the star performer, in terms of sales, with users accounting for four per cent of the response, up from just two per cent last year. This locally-based vendor achieved the fourth highest representation in this year's monitor sample.

Viewsonic also achieved a dramatic increase in representation; up from 1.6 per cent of the sample last year to 2.8 per cent this year.

Overall results

Monitors have always performed well in the APC Service and Reliability Survey for attributes related to the products themselves. Average scores associated with product attributes have remained fairly stable over the life of the survey. This year, however, there was a significant improvement in the scores awarded for after-sales support attributes.

The ease with which product support was obtained was rated at 7.5 in our first survey and remained stable over the next two surveys. This year, monitor users

awarded an average 7.8 points to express the ease with which they had obtained help.

Satisfaction with product support was rated at 7.4 this year, well up on previous scores of between 6.9 and 7.1. Similarly, repair service satisfaction was rated at 7.3, up from the previous range of 6.4 to 6.8.

As with the other sections of this survey end users are noticing an improvement in after-sales support. Vendor initiatives to improve the provision of these services, in an effort to maintain market shares, are being well received by the installed base.

Just over a thousand respondents (1053) took the time to specify details on the nature of the problems encountered with their monitor. Of these, one in five respondents said their monitor was not properly aligned or the active display area had shrunk. A similar proportion (18 per cent) reported problem with colours changing or fading on screen.

Just under one in 10 of the monitor users who specified a problem mentioned focusing, while nine per cent mentioned screen flicker. Power supply problems were identified by 13 per cent of the sample.

Only 264 users specified additional problems they had encountered in attempting to obtain product support. Just over a quarter of these respondents emphasised slow service, while 11 per cent mentioned bad communication with the service provider.

One in 10 of these respondents encountered service providers who lacked the technical knowledge and/or interest to assist them. Just under one in 10 said the after-sales support had not been satisfactorily completed, while eight per cent mentioned excessive distance from the service provider.

ACER

FIVE POINT INDEX
8.5
RANK EQUAL 4th

Acer Computer Australia was established in 1990 and has, since 1992, grown from 45 to 85 employees with a 1993 turnover of \$60 million. The company is part of a Taiwan-based worldwide organisation active in about 100 countries with turnover approaching \$US2 billion,



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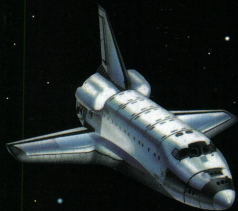


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up from US\$1.2 billion in 1992. Offices are located in all major cities.

In March this year, Acer Software was launched in Australia to promote the Australian software development industry to major Asian IT companies. This project represents the company's first attempt at diversifying into the lucrative software industry.

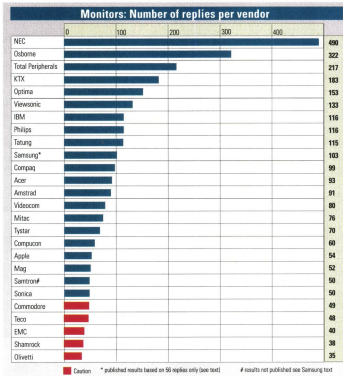
Also in March, Acer announced that it had appointed Wang Australia to manufacture and assemble Acer components. The company has its own Sydney-based assembly plant but increasing demand (for both the domestic and export markets) has led the company to expand production. For more company information see also the PC section. Acer products are backed by a three-year parts and one-year labour warranty. A free technical support service is available by phone and a free bulletin board service is offered. Acer publishes a bimonthly newsletter for clients.

This year, we heard from 93 users of Acer monitors representing two per cent of the entire sample, up from 1.7 per cent last year. Overall, results were good with Acer monitors rated between the top end of average and good for all the attributes surveyed. Our five point index calculated a score of 8.5 for Acer, sufficient to rank the vendor equal fourth and just 0.4 off the top score.

End users awarded 9.2 for overall reliability (exactly the same score as last year), ranking the vendor equal eighth, 0.2 points above the average score. A healthy 91.4 per cent of Acer users participating in our survey said they would buy again from this Taiwanese-based vendor. Although this score is well above average it may be a disappointment for Acer as, last year, a higher proportion of Acer users said they would buy again from this vendor (96.8 per cent), compared with all the others included in our published results.

With around a fifth of users (20.4 per cent) reporting they had experienced at least one difficulty with their monitor since purchase, Acer ranked in the average range, with 16.1 per cent of users going on to contact product support. Acer users were slightly more likely than average to report power supply problems with their monitors.

Acer made its debut in the Service and Reliability Survey in 1992 when scores awarded for after-sales service failed to match those awarded to the products them-



This year we received 4672 completed questionnaires giving details of monitors. The 25 vendors included in our published analysis are shown above together with the number of respondents

selves. It would appear that Acer acted quickly to remedy this situation with 1993 scores showing a marked improvement.

This year, Acer users who had cause to contact product support rated the ease with which this was obtained at 8.3, half a point above the overall average and sufficient to rank this vendor joint sixth. In 1992, users awarded a score of just 7.1 for this attribute.

Similarly, satisfaction with the product support obtained was rated at 8.1, 0.7 above average and sufficient to rank Acer fourth. This rating continues to improve, working off a low base of just 4.3 in 1992. Acer was rated at 7.8 in our 1993 survey.

Repair service satisfaction was rated at 7.7 this year, the fifth highest score awarded by users participating in our survey and 0.8 above the overall average. This is the first year that we heard from enough users who had cause to use Acer's repair services to rate the service provided. Repairs were slightly more likely than average to be carried out by the dealer channel.

Acer monitors had been in use for an average of 19 months (about two less than average) with users reporting an average annual downtime of 0.6 days, half the overall average recorded by the survey and well down on the 3.5 day average recorded in the 1992 survey.

This year's results confirm that Acer has overcome its initial teething problems in servicing Australian end users.

AMSTRAD

FIVE POINT INDEX
6.4

RANK 26 (last)

In the first Service and Reliability survey, conducted in 1991, Amstrad users accounted for 6.1 per cent of the entire monitor survey; by 1992 this had fallen to 2.7 per cent and, for the last two years, Amstrad's share of the installed base (among APC readers) appears to have stabilised at around two per cent, although the increasing average age of the monitors included in the survey confirms market share has continued to decline during this two-year period.

In fact, Amstrad monitors were, on average, the oldest included in our published findings, with end users reporting that they had been in use for an average of nearly 39 months, nearly a year and a half longer than the overall average usage recorded by the survey. Despite their age, Amstrad monitors had only been out of use for an average of 1.2 days during the last year, an insignificant 0.1 day longer than the overall average.

During the last four years, Amstrad had a relatively unsuccessful attempt at cracking the corporate market and then appeared to abandon this in favour of an aggressive assault on the growing high street market. Amstrad picked the winners in this market and sold high volumes through Harvey Norman and Brashs, among others. In February 1994 Brian Peaner, Brashs' product manager for computers, told sister publication *PC Week* that Amstrad sales had been strong until November 1993, rivaling IBM for the top spot by volume.

Despite this apparent success IDC estimates Amstrad's PC revenue fell 30 per cent during 1993 and in the first quarter of 1994 it became apparent that Amstrad was pulling out of the Australian PC market. At the time of writing the company was reportedly looking for a service agency to honour existing contracts, leaving at least one major retailer less than pleased as it experienced increasing difficulty with obtaining support.

For the fourth year running APC's Service and Reliability Survey findings quantify those concerns. Our Five Point Index awarded a score of just 6.4 to Amstrad, the lowest recorded by the survey and half a point below the next weakest score.

The 91 Amstrad monitor users par-

ticipating in our survey rated their monitors as the least reliable of all the 26 brands included in the published results. End users awarded a score of just 7.8 for this critical attribute, 1.2 points below the average and 0.3 behind the next lowest score (8.1 awarded to Mitac).

In the first Service and Reliability survey Amstrad users rated their monitors at a respectable 8.7 for overall reliability, a score just 0.1 points behind the overall average. However, since that time there has been a consistent decline with users awarding just 8.1 points in 1992, and 8.0 in 1993.

Similarly, the proportion of end users who said they would buy another Amstrad monitor has declined over the four years with 70.1 per cent saying "yes" in 1991, 59.8 per cent in 1992, 50 per cent last year and the same proportion (50.5 per cent) this year. A comparison with the score achieved by top ranking vendor Philips (94.8 per cent) gives some indication of the problems faced by Amstrad as it sought to defend market share. More and more users were walking away from the brand and telling friends and colleagues of their unenviable experiences.

A quarter of the Amstrad users participating in this year's survey (25.3 per cent) said they had experienced at least one difficulty with their monitor since purchase and roughly the same proportion (23.1 per cent) had gone on to contact product support. Again these scores were weaker than those obtained in previous surveys where about a fifth of the sample reported problems and a slightly smaller proportion had contacted product support. Amstrad users were more likely to report colour/shading fading and/or focusing problems and were more likely to complain of screen flicker.

When asked to rate the ease with which product support had been obtained Amstrad users awarded just 5.6 points, 2.2 below the overall average, sufficiently weak enough to rank this vendor last. In 1992, end users rated the ease with which support had been obtained in line with the overall average at 7.4, but by 1993 this had fallen to 5.0, rating the vendor the most difficult to obtain support from.

On a more positive note, satisfaction with the product support provided improved this year with end users awarding a score of 6.6 points. Although this score remains 0.8 behind the overall average, and ranked Amstrad third from bottom of the 26 vendors included in our analysis, the fact remains that this is a significant improvement on the dismal 3.5 points awarded last year. The 1994 score is in line with those awarded in our 1991 and 1992 surveys.

Insufficient replies were received to rate Amstrad's repair services this year. In the two previous years it had been rated at

about half a point above product support. Repairs were more likely than average to have been carried out by third parties.

As stated above, Amstrad achieved the lowest five point index score — just 6.4 — in this year's survey, and marks, probably, a sad finale to this UK-based vendor's presence in the Australian PC market.

APPLE

**FIVE
POINT
INDEX**

8.2

RANK EQUAL TO

Apple Computer Australia, part of an \$US8 billion dollar worldwide organisation, was formed in 1982 and has, since 1985, enjoyed the enviable position of having the largest market share of any microcomputer vendor operating in Australia.

The fight to maintain the number one position has been tough with this proprietary-based vendor having to face stiff competition from the IBM platform. That competition has not only been based on price but also on technological advancement.

Apple has successfully managed to compete on price, squeezing its own margins in the process, but still able to command a respectable premium for some models based on company reputation — the relative ease-of-use of Apple's end user interface and the strength of the brand name in several niche markets such as desktop publishing and education.

On the technological front, Apple has not become complacent, forming perhaps the most unlikely strategic alliance yet seen by the IT industry, with former arch-rival IBM (and Motorola). Together, these three giants of the industry have developed the PowerPC, which is set to take on Intel (and Microsoft) in the next stage of evolution on the desktop.

In addition, Apple has worked hard to keep abreast with demands for open systems and has developed a variety of interoperability, networking and communication products which should ensure the brand is not squeezed from the corporate environment as the push for client server gains momentum. (More company information is given in the PC section.)

Apple supports its products through a network of company-trained resellers; direct contact with the vendor is limited to 008 technical support numbers and a newsletter.

This year, we heard from 54 Apple users, but this should not be taken as an indication of installed base. The unique position of Apple as a supplier of a proprietary system implies that usage will be under-represented in a survey of readers of an IBM-compatible PC-based publication.

As usual, Apple achieved excellent scores for attributes related to the monitors, but overall performance was impaired by an average performance for after-sales service. All the respondents who had sought product support and/or repair services had done so through the dealer channel. However, it was only a small minority of the users of Apple monitors who had encountered sufficient difficulties to seek assistance.

Apple achieved a near perfect 9.7 for overall reliability, well up on the average (9.0), and 0.2 above the next highest score awarded by participants in our survey. In the last three surveys Apple was awarded 9.3 (9.4 in 1991) for this critical attribute.

Despite the improved score for reliability, brand loyalty would appear to have slipped slightly, with 90.7 per cent of users reporting they would buy another Apple monitor. Although this is a highly respectable score by any measure it must come as a slight disappointment for Apple which has become accustomed to scores of around 95 per cent in this category.

Certainly the blame for this decrease cannot be attributed to the monitors themselves. Just 5.6 per cent of users reported experiencing at least one difficulty with their monitor since purchase (5.7 per cent last year) and, for the second year running, no other vendor enjoyed a lower proportion of problems.

Only 9.3 per cent of users had cause to seek product support, down from 15.3 per cent in 1992 and 11.4 per cent last year. This year, Apple monitor users were roughly half as likely as the average monitor user to require assistance.

When it came to obtaining product support, Apple users awarded just 7.5, 0.3 below the overall average. Although this score was sufficient to classify Apple as average, it is significantly down on the score of 8.7 awarded in 1992. In fact, only six other vendors were awarded lower scores for this attribute in this year's survey.

Similarly, satisfaction with product support was rated as average with Apple achieving 7.3 out of 10, 0.1 below the overall average. Again this was well down on the score of 8.4 awarded to Apple in 1992. Insufficient replies were received this year to rate the repair services provided to users of Apple monitors.

Apple monitors had been in use for an average of 22 months, exactly in line with the overall average age recorded by the survey. Emphasising the reliability of the product end users reported that their monitors had not been unusable for any insignificant time during the last year, a perfect result for the second year running.

Although, as a general principal,



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TAKE A CLOSER LOOK



PHILIPS

average scores in fact mean good scores in this survey, it is disappointing to see a premium vendor such as Apple have its overall performance impaired by factors not directly in its control. To maintain a presence in the increasingly complex corporate environment, all vendors (and particularly Apple) must ensure easy access to knowledgeable technical support.

It is surprising to note that this vendor does not support bulletin boards, automated voice information lines, fax-back services or even fee-based services and offers only limited free technical support by phone. As the pre-existing Apple-only dealer network diversifies into providing competing product and high street retailers are recruited to the distribution, network Apple can no longer expect first-class after-sales support through the dealer network. Provision of some of these services (even the low-cost options) would undoubtedly improve Apple's Five Point Index ranking from the seventh position where it ended this year.

COMMODORE

FIVE POINT INDEX
7.1

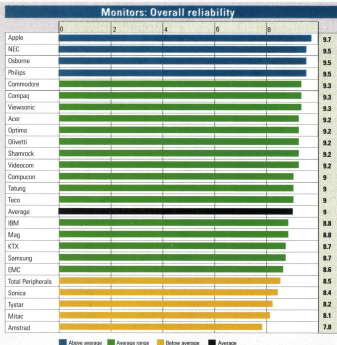
RANK 26th

The future of Commodore in Australia remains, at the time of writing, unclear with the US-based parent reporting a second quarter loss of \$11.5 million. The local organisation, Commodore Business Machines, was placed in liquidation in March 1994 with debts estimated at \$3 million. Commodore Asia-Pacific has been appointed as caretaker of the Australian market.

This year, we heard from 49 users of Commodore monitors and therefore results should be treated with caution as the response rate is relatively low. Commodore's Five Point Index (including a default average score for repair services) was among the lowest recorded by the survey with only two vendors — Mitac and Amstrad — achieving lower results.

After-sales support is clearly Commodore's Achilles' heel with the scores awarded for attributes related to the monitors themselves as the top end of average or in the above average category.

Users awarded 9.3 for overall reliability — 0.3 above the overall average and sufficient to rank this vendor equal fifth for this



The average score awarded for the overall reliability of monitors has remained relatively unchanged over the four years APC has been conducting the Service and Reliability Survey. As with the past two surveys only four vendors achieved high enough scores to be rated as above average. NEC, Osborne and Philips are no strangers to this classification, the first two having been in the above average range for all four surveys. Philips were rated above average for this attribute in last year's survey

critical attribute. This result continues a strong trend with Commodore monitors achieving a score of just 8.2 for overall reliability in 1992, followed by 8.6 in 1993.

This year's excellent score was not, however, reflected in the brand loyalty indicator with just two thirds of Commodore users (67.3 per cent) saying they would buy another monitor from the same vendor. Only two vendors achieved lower brand loyalty scores. In fact, Commodore's brand loyalty rating has declined since last year (74.3 per cent), despite the improved rating for reliability.

Further evidence that there is not much wrong with the monitors comes from the fact that only 8.2 per cent of users reported experiencing at least one difficulty with their monitor since purchase. Only Apple users were less likely to report a problem. Again, Commodore's track record continues to improve with a third (35.1 per cent) of users reporting a problem in 1992 and exactly a fifth in 1993.

Despite the low proportion of users who experienced at least one difficulty, over a fifth of users (22.4 per cent) had contacted product support (about the same proportion as in the two previous surveys), above the average of 17.3 per cent. When it came to obtaining product support, Commodore users awarded just 5.7 points to express the ease with which product support had been obtained. This

result was an insignificant 0.1 point above the lowest score awarded in the survey (to Amstrad).

In 1992, Commodore users awarded just 5.0 to express the ease with which they had obtained assistance but this increased to a respectable 7.8 in our 1993 survey.

Satisfaction with product support failed to rate much better than this year's ease of obtaining support score, with users awarding a score of 6.5, nearly a point below the overall average and sufficiently weak to rank Commodore second from last. The burden of providing technical support to our respondents was split equally between the dealer channel and the vendor itself. Again, this score is a disappointment after Commodore raised its performance to an above average 8.1 last year, following a 1992 debut of just 4.6.

Insufficient replies were received to rate repair service satisfaction.

Commodore monitors included in our survey were an average of 8.5 months older than the overall average recorded by the survey. Users reported that their monitors had been out of action for an average of 1.7 days during the last year, nearly half a day longer than average.

COMPAQ

FIVE POINT INDEX
8.7

RANK EQUAL 2nd

Just two years ago Compaq appeared to be headed for the IT industry's Jurassic Park. The dinosaur was seemingly unable to adapt to the evolution in the market. Compaq appeared, to many industry analysts, to be standing back watching its market share erode as increasing numbers of blue chip clients deserted this traditional high quality, high premium, supplier in favour of low cost, and increasingly reliable, clone manufacturers.

In a remarkable turnaround, Houston-based Compaq replaced founding CEO Rod Canion with Eckhard Pfeiffer. This appointment would see the organisation undergo an innovative restructuring programme executed at a breathtaking pace.

Part of Compaq's success is due to the company taking a close look at the changing distribution channel and following the market to the high street, adding chain stores to the pre-existing network of resellers.

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A diversified product range has been introduced and serviced by multiple new product announcements (over 100 last year) to cater for every significant niche in the PC market.

Today, Compaq operates in over 100 countries and enjoyed a \$US7.2 billion turnover in 1993. (More details on Compaq's remarkable turnaround are given in the PC section.)

Locally, products are supported through certified dealers with some portable repairs carried out by the vendor itself. All products are supplied with a three-year parts and one-year labour warranty, backed by a free technical support phone service. Compaq has kept abreast of technological innovations in the after-sales service arena and offers a wide range of support options with an automated voice information line, fax back service, public bulletin board (available through CompuServe), free private bulletin board and a CD-ROM product.

This year, we heard from 99 users of Compaq monitors, representing 2.1 per cent of the entire sample, up from 1.7 per cent last year. To achieve this increase in the installed base implies a dramatic increase in sales, as shown by company results and IDC industry research.

Compaq achieved an excellent set of results this year, the Five Point Index score achieved by this US-based vendor was the second highest recorded in the survey. This achievement is made more remarkable by the fact that Compaq relies on its dealer channel to carry out a larger than average proportion of after-sales support. It should also be noted that we have not differentiated between models (including everything from monitors supplied with low end Presarios to top of the range DeskPro and LTE portables) in our analysis, making the result still more impressive.

End users awarded their Compaq monitors 9.3 for overall reliability, 0.3 above average, and sufficient to rank the vendor equal fifth. This year's score represents a slight improvement over the previous two years' findings (9.0) which, in turn were up on our first year result of 8.6.

Brand loyalty however, would not appear to have been affected by this improvement, with an average proportion of Compaq users reporting they would buy another monitor

from the same vendor (85.9 per cent). This was in line with last year's proportion — 84.4 per cent.

Compaq users were slightly less likely than average to report having experienced at least one difficulty with their monitor since purchase, with only 14.1 per cent of the sample reporting a problem, against an overall average of 19.1 per cent. Similarly, only 12.1 per cent of Compaq users had experienced a need to contact product support, well below the overall average of 17.3 per cent.

The ease with which product support was obtained was rated above average with end users awarding 8.3 points, half a point above average and exactly the same score as achieved last year.

When asked to rate satisfaction with after-sales services the scores awarded by participants in this year's survey were dramatically different from those awarded last year. In fact, the two sets of scores are so different it is almost as if respondents are talking about completely different companies.

Product support satisfaction was rated at 8.2 points, 0.8 above average and just 0.3 behind the top score and placing Compaq well among the top scoring brands. Last year, respondents who had experienced product support for their Compaq monitor

rated that support at just 5.8, 0.9 below average, which was considerably below the score of 7.8 awarded in both the two preceding surveys.

The story was the same with repair service satisfaction with Compaq users awarding 9.0 points in this year's survey, the highest score achieved. Last year, users awarded Compaq just 6.3 points for this same attribute, half a point below average. In 1992, Compaq users awarded 6.2 for repair service satisfaction against an average of 6.9.

Reflecting this satisfaction with repair services offered Compaq users reported that their monitors had been out of action for an average of just half a day during the last year, compared with the overall average of 1.2 days.

With results like these, Compaq's game plan to become Australia's number one supplier of PC systems does not appear unrealistic.

COMPUCON

FIVE
POINT
INDEX

8.0

RANK EQUAL 11th

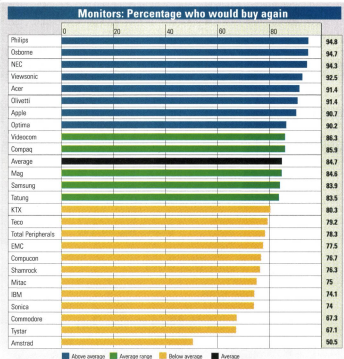
Keap Technology was established in Australia in 1988 and assembles and markets the Compucon range of PCs and monitors from components sourced all over Asia. Originally established in Sydney, the company is now represented in Melbourne, Brisbane and Adelaide; all of which offer technical support.

During 1993, turnover approached \$A35 million with growth projected at 20 per cent for 1994. The local company is associated with Karin Holdings, a massive electrical component supplier based in Hong Kong.

Compucon monitors are supplied with a two-year parts and labour warranty backed by a free technical support phone service. A fax-back service is also available and a fortnightly newsletter is published.

This year, we heard from 60 users of Compucon monitors, a near 50 per cent increase on the 41 users who participated in our survey last year. The average age of monitors included in this year's survey was in line with the overall average.

Our Five Point Index indicates that Compucon's overall performance was exactly in line with the overall average



The overall average percentage of monitor users who said they would purchase another monitor from the same vendor remained static. For the second year eight vendors were rated in the above average range. Olivetti, a newcomer to this section of the survey, was the only vendor, among the eight, new to this rating. Videocom just failed to hold on to the above average status it achieved last year. More monitor vendors were rated below average in response to this year's survey compared with last year when only five vendors achieved brand loyalty scores of under 81 per cent compared with 12 this year.



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recorded by all monitor users participating in our survey. (Despite the fact that we had to attribute Compucon with an average score for satisfaction with repair services as we received insufficient replies to rate the vendor for this attribute in its own right).

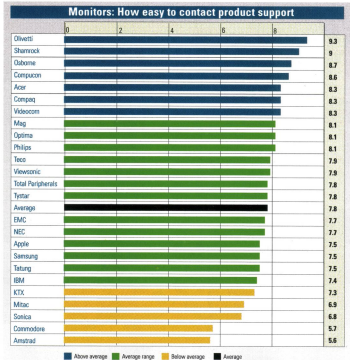
End users rated the overall reliability of their Compucon monitors at nine points, exactly in line with the overall average. Compucon made its debut in the 1992 Service and Reliability survey when end users awarded nine points for overall reliability. In 1993, users similarly rated the reliability of their Compucon monitors at 8.9.

This year, just over three quarters of the Compucon users participating in our research (76.7 per cent) said they would buy another monitor from the same vendor, indicating a brand loyalty factor some eight per cent below average. This will come as a disappointment for this local assembler as end users have, in the previous two years of surveying, awarded brand loyalty scores about two per cent ahead of the overall averages.

Only 15 per cent of this year's Compucon sample reported experiencing any difficulty with their monitor since purchase, 4.1 per cent below average. Only 13.3 per cent reported having to contact product support, 4.3 per cent below average. Both these scores represent a slight improvement over previous survey results.

Compucon users rated the ease with which product support had been obtained at 8.6 out of 10, 0.8 above the overall average and sufficient to rank this local assembler in the top four scoring vendors. This result was in line with our 1992 findings but represents a significant improvement over last year's results when end users awarded Compucon only 6.7 points for this attribute, a score sufficiently weak to rank the vendor last but one, with only Amstrad achieving a lower score.

Satisfaction with the product support received was rated at 7.6 out of 10, 0.2 above the overall average score. In 1992, Compucon users awarded just 5.3 points for this attribute, 1.5 below the overall average and, in 1993, users awarded 5.6 points, 1.3 points below the overall average. It should also be noted that the majority of Compucon users participating in this year's survey had relied on the dealer channel to supply after-sales sup-



The ease of obtaining support was rated overall at 7.8, up from 7.6 in the two previous surveys. Users of monitors supplied by seven vendors reported better than average experiences in obtaining help, down from eight last year. Users of monitors made by newcomer Olivetti reported the least difficulty in obtaining help, awarding an outstanding score of 9.3

port, making this improvement in performance all the more noteworthy.

We did not hear from enough end users who had experienced Compucon's repair services to rate this company for this attribute. Reflecting the limited demand for repair services Compucon users reported their monitors had been out of action for an average of just 0.6 days, exactly half the overall average downtime recorded by the survey.

The improved after-sales experience scores were sufficient to improve Compucon's overall performance to exactly match the average awarded by all 4672 participants in this year's Service and Reliability Survey.

EMC

FIVE POINT INDEX 7.8
RANK EQUAL 14th

EMC is a large system memory and peripherals specialist and it is not surprising, therefore, that for the second year running, this vendor just scraped sufficient response to be included in this section of our survey. This year, we heard from 40 users of EMC monitors, down from the 46 users who participated last year. Given this small absolute level of response, readers should treat the results with caution as only a narrow band of user opinions are represented here.

Overall, EMC monitors performed in line with the overall average with our Five Point Index awarding a score of 7.8, just 0.2 behind the overall average. However, it should be noted that this index score includes average scores for satisfaction with both product support and repair services as we received insufficient replies to accurately quantify the level of after-sales support offered by this vendor.

For overall reliability, EMC users rated their monitors at 8.6, 0.4 below average and just sufficient to rank the vendor in the average category. This result was in line with last year's finding, 8.8. This year, users reported the average age of their monitors to be in line with the overall average age of all the monitors included in our survey (22.2 months against 21.9). Last year, the average age of EMC monitors was well below average (11.6 months against 20.7), which could be expected to give the vendor an advantage when measuring the critical overall reliability attribute.

Just over three quarters of current users (77.5 per cent) said they would purchase another monitor from EMC, nearly seven per cent down on the overall average. This critical result, indicating brand loyalty, was significantly down on last year when 89.1 per cent of participants said they would buy again from EMC.

Only 15 per cent of this year's sample said they had experienced at least one problem with their EMC monitor since purchase, placing this vendor in the better than average category. This finding was in line with last year's when 13 per cent of participants reported at least one difficulty.

In an anomalous result nearly a third of the EMC users participating in this year's survey said they had contacted product support. This was well above average (17.3 per cent) and represents a significant departure from last year's finding when only 6.5 per cent of users had needed assistance, the lowest proportion recorded in our 1993 survey.

Despite the apparent increase in demand for technical support EMC (and more usually the dealer channel) did not have a problem meeting this demand. End users awarded 7.7 points to express the ease with which they had obtained help, an insignificant 0.1 points below the over-

all average recorded by this year's survey.

Unfortunately, we did not receive enough replies to rate the after-sales support offered to the users of EMC monitors. However, EMC users did report that their monitors had been out of action for an average of just 0.1 day, well below the overall average of 1.2 days.

IBM

**FIVE
POINT
INDEX**
7.7
RANK EQUAL 10th

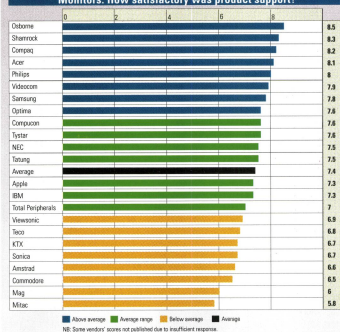
IBM monitor sales have obviously rocketed during the last year. In 1992, we heard from just 57 users of IBM monitors representing about 1.5 per cent of the entire sample. This year we heard from double the absolute number of respondents (116), representing 2.5 per cent of the installed base.

To achieve this dramatic increase implies an even more dramatic increase in sales, as monitors are in use for an average of two years; any significant increase in the installed base over one year implies an increase in sales of nearly double that proportion. IBM claims an increase in revenue from PCs of 50 per cent during 1993. Reflecting the increase in the number of new monitors included in the survey the average age of IBM monitors fell from 27.2 months last year to just under two years (23.8 months).

The success of recent restructuring (including setting up the PC business as a separate entity — see PC section for more company details) is reflected in these findings. However, IBM is not completely out of the woods yet. In 1992, IBM respondents accounted for a significant 4.2 per cent of the sample and this, in turn, was down from 6.6 per cent in our initial survey in 1991. Whether IBM can regain this enviable proportion of the monitor market in the 1990s environment is extremely doubtful.

As in previous years IBM's overall performance can only be described as average with our Five Point Index awarding a score of 7.7, 0.3 below the overall average. It must be emphasised that average results in a survey of this nature are perfectly acceptable. We have only ever advised readers to consider scores significantly below average to indicate shortcomings. However, considering a vendor with the history and international reputation of IBM — with more resources at its disposal than any other company in the market — one can be forgiven for expecting a better performance.

Monitors: How satisfactory was product support?



Overall satisfaction with product support increased this year with users awarding an average of 7.4 points up from 6.9 last year (and 6.8 the year before).

Six vendors were awarded significantly above average scores with Osborne, Acer and Philips featuring among them for at least a second time. Newcomer Shamrock achieved a good result

When asked to rate the overall reliability of their monitors, IBM users awarded 8.8 points, 0.2 below the overall average and consistent with last year's result: 8.9. However, it should be noted that these results are up significantly on the findings of our first two surveys when end users awarded IBM 8.1 for overall reliability in 1991, and 8.2 in 1992.

This year nearly three quarters of the IBM users participating in our research (74.1 per cent), said they would buy another IBM monitor. This ratio has remained fairly static for three years but is below IBM's performance in our first survey (84 per cent).

Around a fifth of the users of IBM monitors (18.1 per cent — one per cent below average) reported experiencing at least one difficulty since purchase and this ratio was down on the 26.3 per cent who reported a problem in both the two previous surveys.

Exactly the same proportion of this year's respondents (18.1 per cent) had gone on to contact product support, again down on the last two years' findings.

The ease with which product support was obtained was rated at 7.4, 0.4 below the overall average and just sufficient to rank IBM in the average range for this attribute. Again, this score is remarkable for its consistency with findings from our two previous surveys.

In 1992, IBM users rated their satisfac-

tion with product support received at just 5.9 out of 10, nearly a point below average. In 1993, end users rated this same attribute at 6.3, just 0.3 below average and this year users awarded 7.3 points. As overall satisfaction with support had improved this year IBM still finds itself trailing the average (only by an insignificant 0.1 points) but this should not detract from the fact that users are reporting a significant improvement.

End users participating in our survey this year were more likely to rely on the Big Blue itself for provision of technical support as opposed to the dealer channel or third-party providers.

Repair service satisfaction followed a similar positive trend with end-users rating the inventor of the PC at just 6.1 in 1992, 6.3 in 1993 and 7.4 this year. The score achieved this year was 0.2 above the overall average recorded by the survey. To back up these improved scores users reported

that their IBM monitors had been out of use for an average of 1.8 days during the last year, well down on the average of three days reported last year, and 3.4 in 1992. IBM's average down time was still longer than the overall average for monitors, 1.2 days.

KTX

**FIVE
POINT
INDEX**
7.5
RANK 20th

Sydney-based EDGE Technology has evolved from a small keyboard manufacturing business based in Hong Kong to an Australian owned \$140 million turnover operation dealing in both hardware and software.

EDGE began in Australia in 1988 importing electronic components for wholesaling to OEM (original equipment manufacturers) dealers and resellers in NSW. In 1991, EDGE Computer was established and interstate branches opened to provide a national network of wholesale distribution and client service centers.

1993 was a busy year for EDGE with the opening of a New Zealand division and the launch of KTX Technology, formed to distribute Microsoft OEM software products. Also in 1993, the company set up a national marketing organisation to target government and corporate sales and to take advantage of the changing distribution

channel and get product on the high street. Additional company information is given in the PC section, see EDGE.

Products are supported through a 1500-member dealer network and a technical support line. There are plans for a bulletin board service to be introduced this year. EDGE offers a two-year back to base warranty as standard with onsite available at \$135 per system per year (corporate clients have on-site warranty included with system).

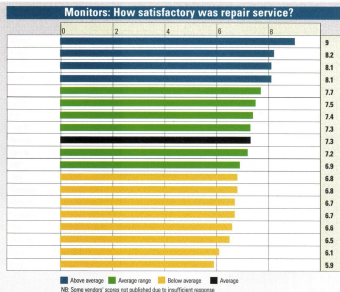
EDGE Technology has undoubtedly sold an enormous quantity of product since the last survey. Last year, the first year that we heard from sufficient users to include EDGE in our survey, we heard from 46 users of monitors wearing the KTX badge and 30 from users of monitors wearing the EDGE badge. This gave the group a combined two per cent share of the installed base. This year, we heard from 183 users of KTX monitors, the fourth highest response by vendor.

KTX monitors are currently in use by four per cent of the installed base (as measured by our survey) which suggests sales have probably tripled during the last year. The relatively young average age of the monitors included in our survey gives further support to this hypothesis. The overall average age of monitors included in our survey was just under two years (21.9 months), while KTX monitors were, on average, only just over a year old (13.9 months) indicating that many respondents had only recently purchased from this vendor.

Despite these impressive findings KTX monitors did not achieve an impressive set of results. Overall, our five point indicator awarded EDGE just 7.5 out of 10, half a point below average and ranking KTX monitors among the six vendors to achieve below average scores.

For the critical attribute overall reliability, KTX users awarded 8.7 points, 0.3 below the overall average and just over four out of five users (80.3 per cent) said they would buy another monitor from this vendor. KTX's brand loyalty rating was only 0.4 points off the score required to rank the vendor in the average range.

Of more concern to the vendor should be the fact that both scores were down on those awarded in last year's survey. KTX users awarded 9.0 for reliability in 1992 and 87 per cent of users said they would buy again from this vendor. Both the 1992



As with product support, satisfaction with repair services is on the increase. This year users awarded an average score of 7.3 points, up from 6.8 last year (and 6.9 the year before).

Compaq was the star performer, achieving a top ranking score of nine points, up from a below average 6.3 last year.

Philips ranked in the above average category for the third year running while Osborne made its second appearance. Tysar performed exceptionally well with users rating their repair services at 8.1, up from a dismal 4.5 last year.

At the other end of the scale newcomer Mag was awarded the weakest score of just 5.9

scores were exactly in line with the overall averages recorded by the survey.

Despite their relative youth end users also reported an increasing incidence of difficulties. Last year, just 8.7 per cent reported having experienced at least one difficulty with their monitor since purchase, while this year that proportion had nearly doubled to 16.4 per cent. However, this year's score was still 2.5 per cent below average.

As would be expected, demand for product support also increased with 17.5 per cent of KTX users seeking assistance, up from 8.7 per cent overall. However, again this year's score was in line with the overall average recorded by the survey.

Where the KTX scores fell down was in the provision of product support. When asked to rate the ease with which support was obtained end users awarded 7.3 points, half a point below average. Obtaining support was not the end of the problem, with users awarding just 6.7 points to express their satisfaction with the support they had received, 0.7 points below average.

Similarly, repair service satisfaction was rated at 6.6 points, 0.7 below average. End users had not, however, suffered extended down time with monitors being out of use for an average of 1.2 days, exactly in line with the overall average recorded by the survey.

KTX has, as discussed above, enjoyed a successful year in terms of sales. With

such a dramatic increase in the number of units shipped it is hardly surprising that the vendor and, more usually, the dealer network have obviously encountered some difficulties coping with the increased demand for product support.

Should the vendor choose to listen to the grievances of the existing installed base (and can exert sufficient pressure for the varied distribution channel to improve service) there is no reason why these competitively priced monitors should not do well in our survey next year.

MAG

FIVE POINT INDEX 7.5

RANK 21st

Magtron Monitors was established in Australia in March 1992 and makes its debut in the Service and Reliability Survey this year. Sydney-based Magtron has 11 employees and specialise in the import, export and wholesale of computer monitors. The company

reports a turnover of \$4.6 million and import monitors from Taiwan-based Mag Technology and Advanced Video and Audio Technology Co.

After-sales service is provided by Magtron in NSW with agents appointed in the other states. Mag monitors are supplied with a one-year parts and labour warranty with a two-year option. Technical support is provided by phone free during the warranty period.

We heard from 52 users of Mag monitors in response to this year's Service and Reliability Survey and end users reported that their monitors had been in use for an average of just over a year (13.8 months), well below the overall average period of usage, 21.9 months. Overall scores were held back by weak results for after-sales support. Our Five Point Index awarded Mag a score of 7.5, the fifth weakest score.

It should be noted however, that the scores awarded for attributes related to the monitors themselves all fell in the average range with end users awarding 8.8 for the critical attribute overall reliability, an insignificant 0.2 points below the overall average.

Additionally, despite the weak scores for after-sales support, 84.6 per cent of users said they would buy another Mag monitor again, another score indistinguishable from the overall average, 84.7 per cent.



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Despite their relative average youth nearly a fifth (19.2 per cent) of Mag monitors had caused their users at least one difficulty since purchase. This finding should not cause too much concern as the result was in line with the overall average, 19.1 per cent. Just over a fifth of users (21.2 per cent) sought product support and this was above the overall average of 17.3 per cent.

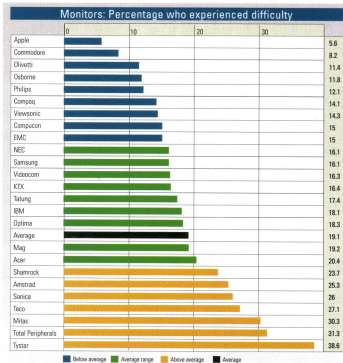
Mag users did not experience significant difficulties with obtaining product support, awarding an average score of 8.1, placing this vendor right at the top of the average range. Satisfaction with the support offered did, however, leave something to be desired and end users awarded just six points for this attribute. Overall, the average score was 7.4 and only one other vendor achieved a lower score for product support satisfaction.

Repair service satisfaction was similarly rated at 5.9, 1.4 below the overall average. No other vendor was awarded a lower score for the provision of repair services. Despite this low level of satisfaction Mag users did not experience a significantly longer down time with end users reporting that their monitors had been out of use for an average of 1.5 days, just 0.3 longer than the overall average.

MITAC

FIVE POINT INDEX 6.9
RANK 24th

Mitac Australia was established in July 1991 and took over local distribution of the US parent company's products from Keller Automation. In May



Nearly one in five monitor users reported experiencing at least one difficulty with their monitor since purchase, slightly up on the 17.7 per cent reported last year.

Monitors supplied by nine vendors were significantly less likely to have caused their users problems, compared with eight last year. Apple users were the least likely to report a problem for the second year running. In both surveys less than six per cent of Apple users reported a problem.

1992, local assembly of the Popular Series of PCs commenced in Melbourne and the assembly line was expanded in September 1993 with the addition of the UPstation Series of PCs.

The local IT division of the Mitac Group (a diverse US\$500 million turnover operation) focuses on the supply of systems and monitors to OEM's including several of Australia's largest IT companies. Mitac claims success in the government, education and corporate sectors. The company is committed to obtaining AS3902 Quality Assurance certification. Mitac monitors are backed by a two-year parts and labour

warranty. Technical support is available free through a telephone service and fax-back service.

Mitac made its debut in the Service and Reliability Survey last year when we heard from just 32 users of Mitac monitors representing 0.9 per cent of the sample. This year, we heard from 76 users representing 1.6 per cent of respondents implying that the company has enjoyed a dramatic increase in sales over the last year. The average age of Mitac monitors included in our survey was just 12 months, making this brand of monitors the youngest to be included in this year's results and providing further evidence of an increase in demand.

For the second time, Mitac did not perform particularly well in our survey. The Five Point Index awarded Mitac a score of just 6.9 points, only the users of Amstrad monitors awarded a lower score. All the scores awarded were below average, whether they were associated with the monitors themselves or the after-sales

support. The majority of the after-sales experience represented in these results was obtained from the dealer network.

Last year, Mitac users awarded a below average score of 8.5 for overall reliability and this year that rating fell to 8.1, nearly a point below average and just 0.3 of a point above the lowest score awarded. The decline in the score awarded for reliability is reflected in a falling brand loyalty rating. Last year, 84.4 per cent of users said they would buy another Mitac monitor, while this year only three quarters (75 per cent) of the Mitac users participating in our research said they would buy again from this vendor.

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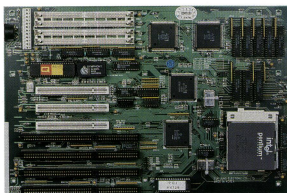
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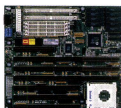
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Despite the relative youth of the Mitac monitors included in our survey three out of 10 end users (30.3 per cent) said they had experienced at least one difficulty with their monitor since purchase. Nearly a quarter of users (23.7 per cent) had gone on to contact product support. Both these scores were well above average, just under a fifth of the entire sample (19.1 per cent) reported experiencing a difficulty with their monitor and 17.3 per cent had gone on to contact product support.

End users reported relative difficulty in obtaining product support and awarded a score of just 6.9 points, nearly a point below the overall average and sufficiently weak to rank Mitac in the bottom four vendors. Satisfaction with the product support provided fared even worse, with end users awarding 5.8 points, 1.6 below average and sufficient to rank Mitac last.

Repair service satisfaction was rated at 5.9, 1.4 below average ranking Mitac last bar one. Consistent with this score, end users reported that their monitors had been out of action for an average of 2.3 days, nearly double the overall average downtime recorded by the survey.

Last year, users reported similar difficulties with obtaining product support (6.8) but satisfaction with the service provided rated better with users awarding 6.4 for product support.

NEC

FIVE POINT INDEX 8.2

RANK EQUAL 7th

NEC monitors are marketed and distributed by NEC Home Electronics as opposed to the ISA division which handles PCs. Both companies are part of the same multinational group described in the PC section.

NEC has managed to maintain its dominant position in the monitor market. This year, users of NEC monitors accounted for 10.5 per cent of the sample — a good result as it suggests the company has halted

the trend of declining market share. In 1991, in response to our first Service and Reliability Survey, NEC users accounted for 14.3 per cent of the sample. By 1992 the proportion had decreased to 10.6 per cent and, last year, NEC's share slipped just below 10 per cent (9.9 per cent).

Despite this result (which would suggest buoyant sales during the past year) NEC monitors tended to be slightly older than average with users reporting 26.7 months of use compared with the overall average of just under two years (22 months).

Overall, NEC users awarded scores sufficient to earn the vendor a five point index of 8.2, 0.2 above the overall average. Only six of the 25 companies included in our published results achieved a higher score.

The overall reliability of the NEC monitors included in our survey was rated at 9.5, half a point above average. Only the outstanding score of 9.7 awarded by Apple users beat NEC to the top slot. NEC has been awarded exactly the same reliability score in all four Service and Reliability Surveys to date.

Virtually all (94.3 per cent) the NEC users participating in our research said they would buy another monitor from the same vendor. This was well up on the overall average of 84.7 per cent and an insignificant 0.5 per cent off the top score. Again, this result is consistent with our previous findings which all fell in the range of 94.5 per cent to 96.1 per cent.

On average, nearly a fifth (19.1 per cent) of the monitor users participating in our research reported experiencing at least one problem since purchase. Only 16.1 per cent of NEC users reported experiencing a difficulty. This result was reflected in a lower than average demand for product support. Only 15.9 per cent of NEC users had cause to seek assistance, compared with 17.3 per cent of the sample overall.

As has become the tradition in the Service and Reliability survey end users who had needed after-sales support reported

experiences which failed to match the excellence of the products themselves.

NEC users rated the ease with which product support had been obtained at 7.7 points, 0.1 below average. Satisfaction with support received was rated at 7.5, 0.1 above the overall average. However, it should be noted that both these scores represent a significant improvement on those awarded last year, 6.9 and 6.3 respectively. The 1992 performance was consistent with these lower scores.

Repair service satisfaction was rated at 6.9, 0.4 below average. However, this result marks the end of a negative trend with users awarding 6.4 in 1991, 6.1 in 1992 and 5.8 last year. NEC monitors had been out of action for an average of 1.2 days, 0.1 less than the overall average downtime recorded by the survey.

In contrast to the feedback from NEC PC users, it would appear that NEC Home Electronics has successfully made efforts to improve after-sales support. Another year of similar efforts could well see the scores awarded for after-sales experiences match the standard of excellence set by the monitors themselves. If this occurs, NEC will be a formidable contender for the top slot in our next Service and Reliability Survey.

OCT/OPTIMA

FIVE POINT INDEX 8.2

RANK EQUAL 7th

Optima Computer Technology is a fully Australian-owned company incorporated in 1989. During the 1993 financial year, turnover reached \$40 million, 1992 revenues represented an increase of 155 per cent over the previous year. The company has about 80 employees with headquarters (and assembly plant) in Sydney and branch offices in Brisbane and Melbourne.

Optima has been audited and recommended for accreditation for the Australian Quality Standards AS3902, which will open up the government market for the

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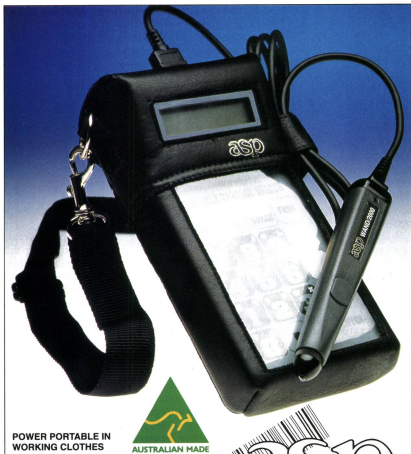
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more remarkable by the fact that Olivetti monitors were, on average, 29.1 months old, 7.2 months longer than the overall average.

Olivetti has always done well for after-sales support; in 1991 end users awarded 8.3 to express the ease with which support had been obtained and this increased to 8.6 in 1992's survey.

OSBORNE

FIVE POINT INDEX
8.9
RANK 1st

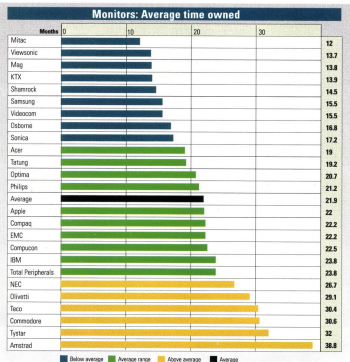
This Australian vendor took the laurels in this year's survey, achieving a Five Point Index of 8.9, the highest achieved. Osborne does not make its own models, instead rebadging Philips monitors up until earlier this year when they switched to Mag. Osborne does provide product support for its ever-growing client base and the scores awarded to express satisfaction with after-sales services matched the standards of excellence set by the products themselves.

Indeed, a crucial part of the Osborne success story has been the company's commitment to after-sales service. This relatively small fully Australian-owned company is, arguably, one of the leaders in the IT world in after-sales support innovations (see the PC section for more company details).

Since the Service and Reliability survey began in 1991 end users have consistently awarded the Osborne products excellent marks across all the attributes surveyed. The high quality of the end product has undoubtedly been a major factor in the company's ability to continue to offer such a generous warranty.

In addition to the telephone technical support line, Osborne offers a free bulletin board service and is installing a fax-back service.

The Osborne success story is encapsulated in the response rates to our surveys over the last four years. In 1991, Osborne just scraped in enough replies to be included in our first Service and Reliability Survey with 27 replies, representing 1.4 per cent of the sample. By the next year Osborne users represented 3.1 per cent of the installed base surveyed and this increased to 5.1 per cent in 1992. This year, we heard from 322 Osborne monitor users representing 6.9 per cent of the sample. Last year, the Osborne sample was just



In line with the results for PCs there was a slight increase in the average time monitors had been in use; up from 20.7 months last year to 21.9.

Armstrong had by far the oldest monitors included in this year's published results

over half as large as the market leader's, NEC. This year, the Osborne sample was nearly two thirds of the size of NEC's.

Reflecting the ever-growing installed base the average age of the Osborne monitors included in our survey was 16.8 months—about five months younger than the overall average age.

Osborne users awarded their monitors 9.5 for overall reliability, half a point ahead of the average and just 0.2 behind the top score, awarded to Apple. Virtually all (94.7 per cent) of Osborne's users were sufficiently happy with their purchase to report that they would buy another monitor from this vendor. The reliability score was consistent with previous findings (9.6 in 1993 and 9.4 in 1992) while the brand loyalty rating increased from 91.5 per cent in 1993 and 91 per cent in 1992.

As would be expected from such high scores demand for product support was low. Only 11.8 per cent of end users reported experiencing any difficulty with their monitor since purchase and just 10.9 per cent had cause to contact product support. Only one vendor (Apple) experienced a lower proportionate demand for product support.

Users rated the ease with which support had been obtained at 8.7, nearly a point above average and sufficient to rank Osborne in third place. User awarded nine points for this same attribute in 1992 and 8.8 in 1993.

Product support satisfaction was rated at 8.5, over a point ahead of the overall average. No other vendor achieved a higher score. This finding was consistent with the two previous surveys (8.4 and 8.5).

Repair service satisfaction was rated at 8.1, just under a point ahead of average, leaving Osborne ranked equal third. Again this result was consistent with our 1993 finding, 7.9. (Insufficient response was received to rate this service in previous surveys). In support of this high score, end users reported that their machines had been out of action for an average of just 0.3 days, a quarter of the overall average down time recorded by the survey.

Osborne is an ambitious organisation with plans to increase turnover to a \$1 billion by the end of the century. With scores like these there can be little doubt that Osborne can anticipate healthy growth in revenues from this side of the business. The only reservation that should be considered is that as Osborne has only recently switched suppliers for its monitors it will not be until next year that we can assess if the Mag monitors selected can match up to the high standards set by Philips.

PHILIPS

FIVE POINT INDEX
8.7
RANK EQUAL 2nd

Up until earlier this year Philips supplied monitors to Osborne and it is not surprising therefore that the scores awarded for attributes related to physical characteristics of both brands were almost identical. Only 0.1 of a point separated Philips from the top spot, and this can be attributed to a relatively weak score for the ease with which product support was obtained.

Demand for Philips monitors would appear to be relatively stable with users making up 2.5 per cent of this year's sample compared with 2.4 per cent last year (2.3 in 1992 and 2.2 in 1991). Consistent with this assumption, Philips monitors were, on average, 21.2 months old, just 0.7 months younger than the overall average.

For the critical attribute overall reliability, users of Philips monitors awarded 9.5 points, half a point above the overall average and only 0.2 short of the top score awarded to Apple. This result

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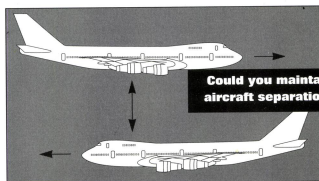
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marks the attainment of a new plateau of excellence; in 1991 end users awarded a score of 9.1 for reliability and this was followed up in 1992 with a score of 9. Last year, users awarded Philips the highest reliability score, 9.7, but it was not clear until now if the difference represented an improvement in quality or a sampling error. With two years of consistent results Philips can be sure that the installed base has noticed an improvement in quality.

Philips enjoyed the highest brand loyalty rating in this year's survey with 94.8 per cent of users saying they would be happy to buy another Philips monitor. Last year, 94.3 per cent of users said they would buy Philips again, and in 1992 95.8 per cent gave this response (up from 90.7 per cent in 1991). Working off such a high base there is nowhere for this figure to go and the improvement in reliability cannot be expected to reflect in these results.

Only 12.1 per cent of users had experienced a problem with their monitor since purchase (an average of 21.2 months ago). This below-average incidence of problems was reflected in relatively low demand for product support, with just 14.7 per cent of Philips' users saying they had sought assistance.

The end users who needed assistance reported that their experiences in obtaining support did not quite match the excellence of the products themselves. However, it should be highlighted that the scores awarded for the after-sales support itself were both well above average and certainly do not imply any shortcomings on the part of the company or its distributor, Clear Technology.

The ease with which product support was obtained was rated at 7.9 points, in line with the overall average, 7.8, but the weakest score awarded to this vendor. The majority of respondents went straight to Philips for their after-sales support needs. The score awarded for this attribute has fallen from a high of 8.8 in 1992 to 8.3 in 1993.

Satisfaction with product support was rated at 8 points, 0.6 ahead of the average and sufficient to rank Philips fourth. Similarly, repair service satisfaction was rated at 8.2 points, nearly a point above average and sufficient to rank Philips second. Consistent with this, end users reported that their monitors had been unusable for an average of just half a day, well down on the overall average of 1.2 days.

Repair service satisfaction has, however, fallen from the high standards reported in previous surveys. In 1992, users awarded 9.1 points for this attribute and, in 1993, users awarded a near perfect 9.5 for repair services. Similarly, satisfaction with product support has fallen from a high of 8.8 in 1993 (8.2 in 1992).

Philips monitors are supplied with a two-year parts and one-year labour warranty backed by free technical support over the phone. A fax-back service is provided together with a private bulletin board by distributor Clear Technology. In addition, a free newsletter is distributed to major clients.

SAMSUNG

FIVE
POINT
INDEX

7.8

RANK EQUAL 14th

We heard from 103 users of monitors that were described by their owners as Samsung. This response rate implies an installed base equivalent to about 2.2 per cent of the whole population surveyed. There is a great deal of confusion between monitors supplied by this Korean-based organisation and those distributed by Samtron.

Samsung monitors are a comparatively recent addition to the local market but the company has been supplying monitors to OEMs (including IBM) for a long time. The company has recently introduced a 'green' series of monitors featuring 76Hz refresh rates, low radiation emission and power-saving features.

For the sake of accuracy in our results we took a detailed look at the Samsung users. We have included in our analysis only those respondents who clearly identified the model of their monitor as one distributed by Samsung. Tabulated results have been based on a sample of 56 confirmed users.

Overall, Samsung's performance was average with only one score (for repair service satisfaction) falling in the below average range. Our Five Point Index awarded Samsung a score of 7.8, an insignificant 0.2 below the overall average calculated for all monitors included in the survey.

For overall reliability, Samsung users awarded their monitors a score of 8.7, 0.3 below the overall average. Just over four out of five users (83.9 per cent) said they would buy another Samsung monitor, a brand loyalty rating an insignificant 0.8 per cent below the overall average.

Samsung was last included in our published results in 1992 when end users awarded exactly the same score for overall reliability (8.7), but reported a slightly higher brand loyalty (89.5 per cent).

Well under a fifth of users had experienced a problem with their monitor since purchase (16.1 per cent), three per cent below the overall average incidence of problems and, coincidentally, three per cent below the 1992 result. This low incidence could, in part, be attributed to the fact the Samsung monitors included in our survey were, on average, 15.5 months old, just over six months younger than the overall average.

The low incidence of problems was reflected in relatively low demand for product support with only 14.3 per cent of Samsung users seeking assistance, compared with the overall average of 17.3 per cent.

Obtaining product support for Samsung monitors (mainly from the dealer channel) was not a problem, with users awarding 7.5 points to express the ease with which support was obtained, just 0.3 below average. Satisfaction with the support provided was rated at 7.8, right at the top of the average range. In 1992, end users reported similar experiences in obtaining support (7.7), but rated their satisfaction with the support offered lower, at seven points.

Repair service satisfaction was not rated so highly with end users awarding just 6.5 points, 0.8 below average and sufficiently weak enough to rank Samsung among the bottom three of the 18 vendors assessed for this service. Despite this relatively weak score, end users reported that their Samsung monitors had been out of action for an average of 0.9 days, 0.3 less than the overall average.

SHAMROCK

FIVE
POINT
INDEX

8.3

RANK EQUAL 6th

This newcomer to the Service and Reliability survey was represented by just 38 users, therefore the results should be treated with caution as only a narrow band of end user experiences are represented.

Shamrock is Taiwanese-based and supplies the monitors Optima rebadged to supply with its systems. Other OEM's use Shamrock monitors and distribute these wearing the manufacturer's badge.

Given these facts it is hardly surprising that the two brands of monitor achieved exactly the same score for overall reliability. However, there were dramatic differences in some of the other scores.

Overall, Shamrock performed well with our Five Point Index calculating a score of 8.3, right at the top end of the average range and sufficient to rank the vendor equal sixth out of the 25 brands compared. It should also be noted that we received insufficient response to rate the repair services offered by this vendor and an average score has been awarded to allow for calculation of the index, making Shamrock's final result more impressive.

Overall reliability was rated at 9.2, 0.2 above the overall average and just half a point off the top score. As a reflection of their recent increase in popularity Shamrock monitors were, on average, just over a year old (14.5 months) significantly younger than the overall average of 21.9 months.

Given the relative youth of these



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monitors it is disturbing that a slightly above average 23.7 per cent of end users reported experiencing at least one difficulty with their monitor since purchase. Consistent with this nearly a third of users (31.6 per cent) had caused to contact product support, well above the overall average of 17.3 per cent — perhaps suggesting some problems with system setup by one or more OEM.

The ease with which product support was obtained was rated at nine points, 1.2 above average while satisfaction with product support was rated an impressive 8.3, nearly a point above the overall average. For both attributes related to product support Shamrock users, who relied on the dealer channel for support, ranked the vendor second.

Although insufficient response was received to rate the repair services offered to Shamrock end users, they reported their monitors had been unusable for an average of 1.6 days, above the overall average down time recorded (1.2 days).

The relative youth of these monitors, taken together with the high incidence of problems and above average down time, go part way to explaining the low brand loyalty score awarded by users of Shamrock monitors. Just over three quarters (76.3 per cent) of Shamrock users said they would buy another monitor from the same vendor, well down on the overall average of 84.7 per cent and in stark contrast to the nine out of 10 Optima users (90.2 per cent) who said they would buy again.

SONICA

FIVE
POINT
INDEX

7.3

RANK 22nd

Sonica is based in Singapore and makes monitors for a wide range of OEMs. At the start of 1993, Sonica claimed to have 10 per cent of the monitor market with over half of the sales being rebagged by local OEMs.

Also at this time the company announced plans to open a manufacturing plant in Sydney in an innovative attempt to meet demand from local PC vendors anxious to increase the local content of their finished product, to win more government business. These ambitious plans apparently came to nothing and the vendor has withdrawn from the local market.

Sonica makes its second appearance in the Service and Reliability Survey this year, represented by 50 end users. Across the five attributes included in our index, Sonica achieved an average of 7.3, significantly below the overall average of eight and sufficiently weak to rank the vendor among the bottom four scores. It should also be noted that the index result was supported by an average score im-

puted for repair services, as insufficient response was received to accurately quantify the vendor in its own right.

For the critical attribute of overall reliability Sonica users awarded a score of 8.4, just over half a point below the overall average. This relatively low score was reflected in the brand loyalty rating with just under three quarters of Sonica users (74 per cent) saying they would buy another monitor from the same vendor. On average, 84.7 per cent of all monitor users said they were sufficiently content with their current brand to purchase another.

These findings are consistent with last year's when Sonica users awarded 8.6 for overall reliability and 74.3 per cent said they would buy again from this vendor.

Just over a quarter (26 per cent) of Sonica users reported experiencing at least one difficulty with their monitor since purchase. This result was slightly above the average proportion of users reporting a problem (19.1 per cent). Additionally, Sonica monitors tended to be younger than average with users reporting their monitors had been in use for an average of 17.2 months, just over four months below the average usage.

Exactly a fifth of Sonica users had contacted product support and these respondents rated the ease with which support was obtained at 6.8, a whole point below average and 0.3 below last year's score. Only the user of two other brands of monitor reported greater difficulty in obtaining support.

Satisfaction with the product support offered to Sonica users was rated at 6.7, 0.7 below average. Repair service satisfaction was not rated by sufficient respondents to be included here, however users reported their monitors had been unusable for 1.7 days, half a day longer than average.

Support does appear to be improving; last year users awarded just 5.4 to express their satisfaction with product support, the second lowest score recorded.

TATUNG

FIVE
POINT
INDEX

8

RANK 11th

Tatung established itself in Australia in 1989. The local office is responsible for marketing Tatung product, offering after-sales service to the Australian and New Zealand markets and sourcing raw materials for the parent company.

The company has appointed distributors in each major city. Tatung Co Australia is part of a diverse multinational group (concentrating on electronics and engineering) with a \$3 billion turnover in 1992, and a five per cent annual growth rate. Tatung monitors are manufactured in

Taiwan and come with a one year parts and labour back to base warranty. Products are backed by a free technical support phone line and a fax-back service. Onsite service options are available.

Sales of Tatung monitors are obviously booming in Australia. The company made its debut in the Service and Reliability Survey back in 1992, represented by just 31 users accounting for 0.7 per cent of the sample. By 1993, that proportion had increased to 2.2 per cent. This year, Tatung monitors were represented by 115 users contributing 2.5 per cent of the population surveyed.

As would be expected with an expanding installed base Tatung users reported that their monitors had been in use for slightly less than the overall average period of usage; 19.2 months compared with 21.9.

The company was awarded scores within the average range for all the attributes surveyed. Our Five Point Index awarded Tatung a score of eight, exactly in line with the overall average of all users participating in our research.

For the critical attribute of overall reliability, end users awarded nine points, exactly in line with the overall average, but down on the 9.4 and 9.3 awarded in our two previous surveys. Similarly, 83.5 per cent of end users said they would buy another monitor from Tatung, inline with the overall average brand loyalty factor (84.7 per cent), but down on the 89 per cent achieved last year and the 96.6 per cent attained in 1992.

Just under a fifth of users (17.4 per cent) had experienced at least one difficulty with their monitor since purchase, against the overall average of 19.1 per cent. Product support was sought by 15.7 per cent of users, slightly below the overall average of 17.3 per cent.

The ease with which product support was obtained was rated at 7.5, 0.3 below average, and down on the score of 8.3 awarded last year. Satisfaction with the product support obtained (mainly through the dealer channel) was rated at 7.5, just 0.1 above average, while repair service satisfaction (obtained mainly from the vendor itself) was rated the same, 0.2 above the overall average. End users also reported an average down time of 0.9 days, 0.3 less than average. These results represent a significant improvement over last year when product support satisfaction was rated at just 5.6 and repair service satisfaction even lower at five.

Although Tatung's results are rather lacklustre, it should be highlighted that average does not imply bad. Any result within the average range implies a perfectly acceptable level of service and all of Tatung's scores fall easily into this

category. The improvement in after-sales support scores over last year's findings should also be highlighted.

TECO

FIVE
POINT
INDEX
7.7
RANK 18th

Teco Australia was established in 1983 as a wholly-owned subsidiary of Taiwan-based Teco Electric and Machinery Co. The multinational parent has a turnover of around \$US2.5 billion.

Teco claims to be Australia's largest supplier of OEM monitors with clients including Compaq, Ipex, NEC, ALR and AST. Teco achieved the Quality Standards AS3902 in May 1993. Monitors are backed by a two-year parts and labour warranty with free technical support available by phone.

This year, we heard from just 48 users of Teco monitors (representing one per cent of the sample), therefore results only reflect a narrow band of user opinions and this should be remembered when interpreting results. Back in 1991, our first Service and Reliability Survey, Teco users accounted for 2.4 per cent of the sample. By 1992, that proportion had decreased to 2.1 per cent and in 1993 Teco users accounted for 1.4 per cent of the population surveyed.

Consistent with this decline in share of installed base end users reported their monitor had been in use for an average of 30.4 months, well above the overall average of 21.9 months.

Overall, Teco's performance this year was on the low side of average with our five point index awarding the company a score of 7.7, against the overall average of eight.

For the critical attribute overall reliability, end users awarded Teco nine points, exactly in line with the overall average. Previous years' results have awarded Teco between 8.8 and 9.2 for this attribute.

Brand loyalty was, however, rated slightly below average with 79.2 per cent of Teco users reporting they would buy another monitor from this vendor against an overall average of 84.7 per cent. This result is down on previous years; 88.5 per cent in 1993 and 86.8 per cent last year.

Given the fact that Teco monitors had been in use for considerably longer than average it is not surprising that a larger than average proportion of users had experienced a difficulty with their monitor since purchase (27.1 per cent compared with 19.1 per cent). This high incidence of problems was reflected in a relatively high demand for product support with over a third (35.4 per cent) of Teco users seeking assistance. No other vendor had a higher

proportionate demand for product support.

Users rated the ease with which product support was obtained at 7.9, 0.1 ahead of the overall average and consistent with last year's finding, 7.7. Satisfaction with product support provided did not, however, rate as well with end users awarding 6.8 points, 0.6 below average. This score is down significantly on the 7.5 awarded in last year's survey. The dealer channel had been used to provide the majority of after-sales services.

Repair service satisfaction was rated at 6.8, half a point below average and consistent with last year's finding of 6.7. Despite their older average age Teco monitors were out of action for an average of only 0.7 days, half a day less than average.

TOTAL PERIPHERALS

FIVE
POINT
INDEX
7.7
RANK EQUAL 18th

Total Peripherals is an Australian company which was founded in 1986 by John and Vicky Teoh. The couple had gained experience of the PC business in Singapore and Malaysia and now head up the second largest Australian-owned PC companies (according to IDC). The company is strong in the government and corporate market segments and is unique

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among the Australian vendors in that it distributes solely through a dealer network.

Total Peripherals has ambitious plans for the future. It recently made several acquisitions including a networking company, accounting software house and another software house specialising in multimedia applications. The company also has plans to incorporate the PowerPC chipset into a new range of product, marking a deviation from the Intel camp to the Apple, IBM, Motorola consortium.

This Australian company achieved slightly below average results for attributes related to the physical properties of the monitors themselves and average results for after-sales service. Overall, our Five Point Index awarded Total Peripherals 7.7 points, 0.3 below the overall average recorded by the 4672 participants in this year's Service and Reliability Survey.

Total Peripherals was represented in this year's survey by 217 end users, accounting for 4.6 per cent of the population as surveyed. In our first survey (conducted in 1991) Total Peripherals users accounted for 3.5 per cent of the sample. By 1992 that proportion had increased to 4.4 per cent and in 1993 share of the installed base peaked at 4.8 per cent.

This year's slight decline implies that Total Peripherals sales have flattened out. This hypothesis is further supported by the fact that the average age of TP monitors included in our survey was nearly two years (23.8 months) slightly older than the overall average, 21.9 months.

Overall reliability was awarded a score of 8.5, half a point below average and sufficiently weak to rank Total Peripherals in the bottom five vendors. In the two previous surveys, TP was awarded 8.8 for this critical attribute, up from 8.4 in 1993.

Our measure of brand loyalty, the proportion of respondents who would buy another monitor from the same vendor, awarded TP a score of 78.3 per cent. This was just sufficiently below the overall average (84.7 per cent) to rank TP in the below average category. This critical indicator of a company's longterm success has declined slightly from 90.5 per cent in 1992 and 81.6 per cent last year.

There has been a slight increase in the proportion of users who reported a problem with their monitor since purchase. In 1992, only a fifth of users reported experiencing difficulties with their monitors and this proportion had increased to 26.3 per cent in last year's results. This year, nearly a third of Total Peripherals users (31.3 per cent) reported a problem with their monitors. Only monitors supplied by one other vendor had caused a higher proportion difficulties.

This high incidence of problems was

reflected in a relatively high demand for product support with over a quarter of TP monitor users (27.2 per cent) reporting they had sought assistance. Again, this result represents an increase over previous years; in 1992 only a fifth of users had sought assistance (20.7 per cent) and that proportion increased to a quarter (25.7 per cent) in last year's survey.

Despite the relatively high proportionate demand Total Peripherals managed to keep its customers happy when it came to supplying after-sales support. End users rated the ease with which they obtained product support at 7.8, exactly in line with the overall average score. However, this score is down on the 8.2 awarded in last year's survey and the 8.3 awarded in 1992.

Satisfaction with the product support provided was rated at seven points, just sufficient to rank Total Peripherals at the low end of the average range. Once again, the score represents the continuation of a declining trend with users awarding 7.6 for this attribute in 1992 and 7.3 in 1993.

Repair service satisfaction was rated at 7.3, 0.1 points above the overall average. Although this score is down on the 7.7 awarded last year, it is up on the seven points awarded in 1992. As would be expected average down time fell in the average range with end users reporting their monitors had been out of action for an average of 1.3 days, just 0.1 days longer than average.

It would appear that a perceived small decline in the quality of after-sales support has led to a decrease in our brand loyalty measure. Total Peripherals appears to have ended its period of rapid expansion in the local PC market. Should they choose to focus on improving after sales support this Australian company should do well in future surveys.

TYSTAR

**FIVE
POINT
INDEX**
7.7
RANK EQUAL 10th

The 70 Tystar users participating in this year's Service and Reliability Survey contributed 1.5 per cent of the sample. In 1991, Tystar users accounted for 1.8 per cent of the sample; by 1992 this proportion had increased to 2.6 per cent. This would appear to be the peak however as in 1993 Tystar users contributed 1.7 per cent of the population surveyed.

Tystar monitors achieved below average ratings for attributes related to the monitors themselves but overall performance was lifted by good scores for after sales support. Our Five Point Index awarded Tystar a score of 7.7 points, just 0.3 below the overall average recorded by all the participants in this year's survey.

Tystar monitors were, on average,

among the oldest to be included in our published findings with users reporting that their monitors had been in use for an average of 32 months. Further evidence to suggest sales of this brand are in decline.

Given this above average period of usage it is not surprising to report that Tystar users were significantly more likely than average to have encountered at least one difficulty with their monitor since purchase. In fact, nearly four out of 10 users (38.6 per cent) reported at least one problem, a higher ratio than reported by the users of any other brand.

This high incidence of problems was reflected in a relatively high demand for product support with a quarter of Tystar users (25.7 per cent) saying they had sought assistance. These factors would appear to have affected Tystar's reliability rating with end users awarding 8.2 for this critical attribute, 0.8 below average and sufficient to rank Tystar among the bottom three vendors. Last year, respondents awarded Tystar 8.5 for this attribute and in 1992 the vendor achieved a score of 8.7.

Similarly brand loyalty appears to have been adversely affected with only two thirds of end users (67.1 per cent) saying they would buy another Tystar monitor, well down on the overall average of 84.7 per cent. A comparison with the top score awarded to Philips (94.8 per cent) emphasises the magnitude of the significance of this finding. In fact, only one vendor (Amstrad) achieved lower brand loyalty rating. Last year, 81 per cent of Tystar users said they would buy again, down from 83.2 per cent in 1992.

Dealer supplied product support was well received with end users awarding 7.8 points to express the ease with which they had obtained help, a score exactly in line with the overall average. This score appears to continue a slight upward trend with users rating their access to support at seven points in 1992 and 7.5 in 1993. Satisfaction with the product support provided was rated at 7.6, 0.2 above the overall average recorded by the survey but down on the score of 8.0 achieved last year.

Repair service satisfaction rated even better, with end users awarding a score of 8.1, 0.8 above the overall average, and ranking Tystar among the top four providers of these services. This result represents a remarkable turnaround from our previous findings when users awarded Tystar just 4.5 for repair services last year, and 5.3 in 1992.

Despite this high score end users reported their monitors had been out of action for an average of 1.2 days during the past year, the same average length of time recorded by the survey overall.

VIDEOCOM

**FIVE
POINT
INDEX** 8.2

RANK EQUAL 7th

Videocom monitors are made by Elite, an Australian-owned company established in 1989. Videocom monitors come with a two-year parts and labour warranty and the company provides free technical support over the phone during this time. In addition, the company operates an automated voice information line, public and private bulletin board services and technical newsletter.

Last year, Videocom made its debut in the Service and Reliability Survey scraping in 37 responses, near the minimum required to be included in the published results. This year, we heard from 80 Videocom monitor users representing 1.7 per cent of the sample, nearly double last year's proportion.

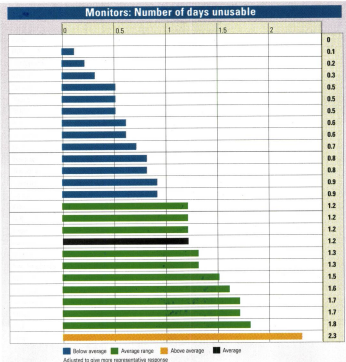
As would be expected, this increase in sales has kept down the average age of Videocom monitors in use. End users reported they had been using their Videocom monitors for an average of 15.5 months, over six months less than the overall average.

The company performed well with only one score falling below the average range. Our Five Point Index awarded Videocom a score of 8.2, 0.2 above the overall average and sufficient to rank the vendor among the top third of the monitor suppliers included in our survey.

Overall reliability was rated at 9.2, 0.2 above the overall average and consistent with last year's finding, 9.3. With a brand loyalty rating of 86.3 per cent, Videocom users were slightly more likely than average to be willing to purchase another monitor from the same vendor. Again this finding was consistent with last year's, 89.2 per cent.

As would be expected, given their relative youth, Videocom monitors were less likely than average to have caused their users problems. Only 14.3 per cent of users said they had encountered any difficulty with their monitor since purchase, well down on the overall average of 19.1 per cent.

Despite the fact users were less likely to have encountered a problem demand for product support was in line with the overall average with 17.5 per cent of Videocom users saying they had sought assistance compared with 17.3 per cent of the sample overall.



For the second year running Apple achieved a perfect result with end-users reporting negligible downtime during the year prior to this survey. Osborne and Philips both achieved outstanding results for a second time

Videocom users rated the ease with which they had obtained product support at 8.3, half a point above average and sufficient to rank the vendor equal fifth. Last year, end users awarded a score of just 6.3 for this attribute. Satisfaction with the service offered was similarly rated at half a point above average with end users awarding a score of 7.9.

Repair service satisfaction was not rated as highly, with Videocom users awarding just 6.8 points, half a point below average. This was the only below average score awarded to this vendor. Despite this low level of satisfaction with repair services, Videocom users reported their monitors had been out of action for an average of 0.8 days, 0.4 of a day less than the overall average downtime.

VIEWSONIC

**FIVE
POINT
INDEX** 8

RANK 11th

Chips and Bits Australia has been the Australian distributor of Viewsonic monitors for three years. Last year, 8000 units were sold and this year the company has ambitiously targeted 25,000 sales, backed by increased infrastructure and budget.

Viewsonic monitors are sold locally with a one-year parts and labour warranty backed by free technical support by phone. In addition, the distributor offers a

fax-back service and operates a free bulletin board. An automated voice information line is currently being implemented.

Last year, Viewsonic made its debut in the Service and Reliability Survey accounting for 1.6 per cent of the response. This year, Viewsonic users made up 2.8 per cent of our sample, suggesting a dramatic increase in sales. This hypothesis is further supported by the fact Viewsonic monitors were, on average, only 13.7 months old, over eight months younger than the overall average.

Satisfaction with after sales support pulled the five point index score down, but end users still awarded 8.0 points, in line with the overall average awarded by all 4672 participants in this year's research.

Overall reliability was rated at 9.3, 0.3 points ahead of the average and sufficient to place Viewsonic among the top five

rankings. This high result was reflected in the brand loyalty rating with 92.5 per cent of end users saying they would buy another monitor from Viewsonic, well up on the overall average of 84.7 per cent. These findings are consistent with last year's when overall reliability was rated at 9.5 and brand loyalty at 96.8 per cent.

Given the short average time in use it is hardly surprising that Viewsonic monitors were less likely than average to have caused their users difficulties. Only 14.3 per cent of end users reported experiencing any problem with their monitor since purchase, well down on the overall average score, 19.1 per cent.

Only 12 per cent of users had attempted to obtain product support, again well down on the overall average of 17.3 per cent. The ease with which support was obtained was rated at 7.9, 0.1 above the overall average but half a point behind last year's score.

Satisfaction with product support was rated below average with users awarding 6.9 points, half a point less than the average but up on the 6.6 awarded last year. Repair service satisfaction was similarly rated at 6.7, 0.6 behind the average. Despite this low level of satisfaction with repair services end users reported that their monitors had been out of action for an average of just 0.8 days during the last year, 0.4 days less than average. ▲

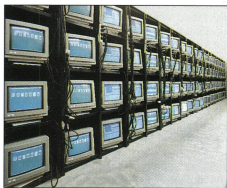
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Printers



BY GEOFF ISAAC

Respondents to our fourth annual Service and Reliability Survey awarded HP top points, in a year where the company grabbed even more marketshare as buyers turned to non-impact products.

The leaders by sales volume in the printer market made an impressive performance in this year's *APC* Service and Reliability Survey. The vendors with the largest representation in the installed base were awarded such high scores that they raised the overall averages recorded by the survey and made it difficult for other players to stand out in the statistical analysis.

Hewlett-Packard took the top spot in our Readers' Choice Five Point Index. This vendor is enjoying an increasing lead in the market in terms of sales. Your report from the front line confirms the company is continuing to supply a first class product backed by first class after-sales support.

Virtually all (97.3 per cent) of the current users of Hewlett-Packard printers

said they would buy again from the same vendor. Given that 1174 HP printer users participated in our research, this is a truly amazing result.

In 1991, we reported that HP had 10.3 per cent share of the installed base as surveyed. This year that proportion passed one in four users (26.5 per cent) and with the results achieved in this year's survey, there can be little doubt about the direction of future movements.

As Hewlett-Packard's share of the market continues to grow, the vendor's major challenge will be to keep the expanding installed base happy. This year, the vendor's repair service score failed to match the standard of excellence set by all other attributes measured in the survey. HP was ranked fifth for the provision of these services, compared with no lower than third for all

the other important attributes measured. The score awarded certainly does not give cause for concern, but it does indicate a possible area of improvement in HP's attempts to remain the king pin of the Australian PC printer market.

Vendors who made a big impact on the dot matrix market dominated the remaining Readers' Choice selections. Citizen and Oki were awarded slightly above average Five Point Index scores, while Epson, Fujitsu and Star matched the average.

Apple, Brother, Canon and Panasonic should also be mentioned as strong performers in this section of the survey. None of these vendors are strangers to the top positions in this section. However, as with the other sections of this survey, Apple users reported a disturbing decrease in satisfaction with product support.

At the other end of the scale, five vendors turned in a below-average performance: Dataproducts, NEC, Sharp, Olivetti and Toshiba (no longer active in the Australian printer market). Only NEC had a significant share of the installed base, at just 3.3 per cent, however this is down from 9.1 per cent in our 1991 survey. All four printer vendors can anticipate a tough future attempting to match the standards set by the market leaders. Olivetti and Dataproducts attracted the worst brand loyalty rating of the companies still trading, adding to the problems faced by these vendors.

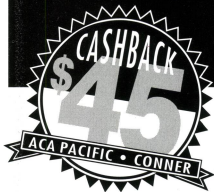
Market summary

The printer market can be described as rapidly maturing. Although vendors continue to share, and enjoy, healthy growth in total demand, the major players have established entrenched positions. There has been relatively little movement in the ranking of the market leaders. Hewlett-Packard has generated spectacular growth in sales and firmly established itself as Australia's largest printer supplier. Behind the leader the pecking order has barely changed since last year.

New vendors entering the Australian market will find it increasingly difficult to make a serious impression here. Dealers and distribution channels have been firmly established and the status quo would appear to be rapidly gaining acceptance.

This year, only two vendors — Dataproducts and Olivetti, who were not included in our published results last year — made a significant enough impact on the market to be included. (No vendors have dropped from our analysis this year.)

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Analysis by market penetration alone, however, masks dramatic changes within the market. The breakdown by printer type (see chart this page) illustrates that non-impact printers are more common among the sample than dot matrix models. Nearly six out of 10 respondents (58 per cent) reported on a non-impact printer, up from 48 per cent last year. In 1991, impact printers were in use by just one in four respondents (26 per cent).

Inkjets, led by Canon's BubbleJet range, have been the star performers here, increasing their share of the installed base from just six per cent in 1991 to exactly a quarter this year. Not content with this stunning performance, inkjet vendors are now attempting to expand their share of the output market by moving in on the corporate network. Inkjets are so cheap a vision of one on every executive's desk is being promoted to alleviate network printing queues. Even if the campaign is only partly successful, inkjet vendors can anticipate a continued growth rate of 30 per cent or more in addition to the output device market growth rate.

Laser printers have increased their share of the installed base from one in five in 1991 to one in three this year. However, since 1992 lasers' share of the base has increased by only one per cent, it suggests that sales are not increasing by a margin significantly greater than the market growth rate.

Dot matrix printers are losing popularity fast; nearly three out of four respondents were using them in 1991 and that proportion fell to just 43 per cent this year. Despite the healthy growth in the market even leading vendors must be finding it hard to maintain sales volumes. Vendors who have made their name and money in the dot matrix market now face a declining product lifecycle. Such vendors only have a year or two to establish themselves in the non-impact market or face the consequences.

As with the other sections of this report, end users reported a slight increase in their overall level of satisfaction. The most significant improvement has been with repair services. In 1991 users awarded just 6.4 to express their satisfaction with repairs; by last year that score had only increased to 6.6. This year, users awarded 7.7 to express their satisfaction with repair services, with nine vendors achieving average, or above, scores.

Other increases are less dramatic with users awarding a score of nine for overall reliability, up from 8.8 in our first survey. Just over nine out of 10 users (91 per cent) said they would buy another printer from the same vendor, up from 87.4 per cent in 1991.

Just over a quarter of the users participating in this year's survey (27.2 per cent) had caused to contact product support, down from one in three users in our 1991 survey (33.9 per cent). The ease with which product support was obtained was rated at 7.7 this year, up from 7.4. Satisfaction with product support increased from 7 to 7.4.

This year, we asked users to give details of their printer problems and 1354 respondents took the time to do so. Of these, over one in three (31 per cent) complained of paper feeding problems. No other problem was identified by such a significant proportion of users specifying details. This result gives a clear indication of an area for improvement by vendors.

Just under one in four of these respondents (24 per cent) reported problems with the print-head, while eight per cent complained of software driver problems. Cartridge or ribbon problems were reported by six per cent of this sample, while the same proportion complained about excessive toner consumption or related problems. Only four per cent of this sample identified a problem with the power supply units of their printers.

Just 324 respondents identified specific problems they had encountered with obtaining product support. Exactly a fifth of

these respondents complained of slow service, while almost the same proportion (18 per cent) complained about rude or unhelpful staff. A similar proportion (14 per cent) complained about staff who apparently lacked the knowledge and/or interest to assist with the problem.

Just over one in 10 of the respondents who completed this section of the questionnaire (11 per cent) said they had encountered a difficulty with obtaining parts while seeking product support.

APPLE

FIVE
POINT
INDEX 8.1
RANK EQUAL 7th

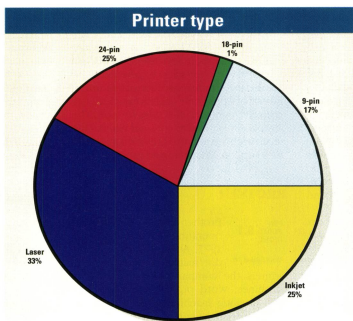
Company background information is given in the PC and monitor section. Apple has traditionally been quite well represented in our printer section, reflecting the common practice of hooking up IBM-compatible PCs and LANs to Apple's output devices.

In the past, the company did not appear to be overly interested in this market segment. End users have previously complained that the documentation was not comprehensive on this topic. The logic for this approach was hard to understand; Apple was locking itself out of the largest market segment, non-Apple sites.

Apple has recently changed this policy; the 1992 annual report includes the following statement, "Apple expanded its peripherals business in 1992 by offering products for the large MS-DOS/Windows market... the Apple Personal LaserWriter NTR brings affordable high-quality printing to both Macintosh and MS-DOS/Windows users."

Apple printers are supported through a network of company-trained resellers. Direct contact with the vendor is limited to 008 technical support numbers and a newsletter. Apple has resisted pressure from competitors and left its warranty period at three months. With products that consistently achieve high-reliability scores, and are unlikely to cause their users problems, this is another Apple policy which is difficult to understand.

Apple's almost exclusively laser printer users accounted for 1.7 per cent of the sample this year, up from 1.4 per cent last year. Users rated the overall reliability of their Apple printers at 8.9 out of 10, just 0.1 behind the average score awarded by the 4430 printer



Printer type: The switch to non-impact printers is clearly demonstrated by this chart. Any printer vendor not active in the laser or inkjet market segments by the end of this year faces serious problems as demand for impact printers dries up

users participating in our research. It would appear that the vendor has managed to halt a downward trend in the scores awarded for this critical attribute. Back in 1991, Apple users participating in our research awarded a score of 9.2 for reliability. This was followed by a score of 9.0 in 1992, which decreased to 8.6 last year.

In the first two Service and Reliability Surveys, Apple achieved very high brand loyalty indicators, with 92.2 and 94.8 per cent of users saying they would buy another printer from Apple. Last year, that rating fell to 82.9 per cent, consistent with the decreased reliability score awarded. As would be expected from the positive outcome of the reliability rating 88.3 per cent of Apple users participating in this year's survey said they would buy again from the same vendor.

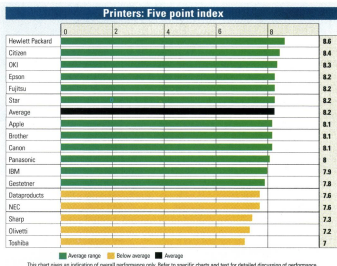
Less than a quarter of the Apple users surveyed (23.4 per cent) reported experiencing a difficulty with their printer since purchase and this was in line with the overall average, 23.9 per cent. Last year, over six out of 10 Apple users (61 per cent) reported a problem, the highest proportion included in our published findings. It would appear that the 1993 result was an anomaly as this year's finding is consistent with the results of our two previous surveys of 22.1 per cent in 1992, and 31.4 per cent in 1993.

Demand for product support was also in line with the overall average with just under a quarter of the sample (23.4 per cent) reporting they had sought assistance. This was a significantly lower proportion than that recorded in previous surveys.

The ease with which product support was obtained was rated at 7.5, 0.2 below average. In both 1991 and 1992, Apple was awarded the highest score for this attribute, 8.9 and 8.3 respectively. In 1993 the company achieved a score of just 6.5, the second lowest score recorded in the survey.

Satisfaction with product support received rated at just 6.8, over half a point below the overall average; a finding that was consistent with last year's score of 6.7. Again, the company has a long way to go to reach the standard of excellence obtained in our first two surveys, 8.4 and 7.7 respectively.

Across all three sections of this year's survey Apple's scores for product support were down on previous years. Interestingly, repair service satisfaction rated much better with users awarding Apple an above average 8.3 for this attribute. The rating for



In response to reader requests we have attempted to summarise the main findings of our PC research in one chart. We have taken the scores awarded for five major attributes surveyed and calculated an average for each vendor. This chart is only an indicator of overall performance as averages can be misleading. A vendor might, for example, have achieved excellent scores for product support but fallen down for overall reliability. Readers are encouraged to refer to the main text

repair services was in line with the high scores achieved in 1991 (7.8) and 1992 (7.9). Last year, users awarded just 7.1 for this attribute. The good result for repair service was reflected in the average downtime reported by Apple users: 1.2 days compared with the overall average of 2.2.

The majority of Apple printer users participating in our research commented on laser printers and it is therefore unsurprising that the scores awarded to this product category did not differ substantially from those awarded to the vendor overall.

As Apple relies heavily on the dealer channel to support end users, it has less control over after-sales experiences. As detailed in the monitor section of this article, the end of Apple-only dealers can clearly be expected to impact after-sales support. The company may need to consider making the necessary investment to provide some after-sales support directly to end users.

BROTHER

**FIVE
POINT
INDEX**
8.1
RANK EQUAL 7th

Brother Industries has been operating in Australia since 1977. As well as its range of dot matrix, inkjet and laser printers the company also markets fax machines, word processors, typewriters and labelling machines. The local company is part of a Japan-based multinational operating throughout the world. Brother recently achieved International Quality Standard ISO 9000.

Brother printers are supported by a one-year parts and labour warranty. Technical support is available over the phone

(although not for free) and via a fax-back service. None of the other after-sales support options made possible by technological advances are offered by this vendor. The distribution channel is heavily relied upon to provide after-sales support.

Brother users accounted for 3.7 per cent of this year's sample, down from 4.5 per cent last year. Despite the apparent decline in market share, Brother printers included in our survey were not significantly older than the overall average (27.6 months compared with 27.4 months respectively).

Overall, the vendor achieved a Five Point Index of 8.1, which was an insignificant 0.1 below the overall average and sufficient to rank the vendor equal seventh. However, this average overall result

masks some significant variations in the scores awarded to individual attributes.

When asked to rate the overall reliability of their Brother printers, end users awarded 9.0 points, which was exactly in line with the overall average. Previous results have all been in the 8.7 to 9 range and always in line with the survey average.

Brand loyalty was also rated in line with the survey's overall average, 91 per cent. When asked if they would buy another printer from Brother, 87.1 per cent of users said they would. This finding is consistent with our previous findings: 86.9 per cent last year and 93 per cent in 1992.

The proportion of users who had experienced difficulty together with the proportion who had experienced cause to contact product support were both in line with the survey's averages. Just under a quarter of Brother users (24.5 per cent) said they had experienced at least one problem with their printer since purchase (average was 23.9 per cent), while roughly the same proportion (23.3 per cent) had contacted product support (average 27.2 per cent). These results were almost identical to those reported in our previous research.

Users seeking assistance did not report any significant problems in obtaining help, awarding 7.5 points to express the ease with which support was obtained. This result is consistent with last year's result, 7.6. Up until this year Brother had been achieving a small but consistent positive trend in the scores awarded for this attribute — 7.1 in 1991 and 7.3 in 1992.

Where Brother fell down in this year's survey was for the provision of product

support. End users awarded just 6.7 to express their satisfaction with the services provided, the fourth weakest score awarded in the survey. However, it should be pointed out that Brother users awarded just 6.1 points for this same attribute last year. This year's score returns Brother to the standard set during the first two years of the Service and Reliability Survey — 6.6 in 1991, 6.7 in 1992. (However, the overall average has increased since this time as detailed in the introduction to this section).

Interestingly, repair service satisfaction was rated at 7.8, in line with the survey's overall average. Scores in previous surveys for the same attribute were about a point lower, however all the scores were in line with the average for repair services.

Brother printers had been out of action for an average of just 0.9 days during the year prior to survey, well down on the overall average of 2.2 days.

We received sufficient response to look at Brother printer users by product category. The 9-pin model users awarded 9.4 for overall reliability, 0.4 above the average score awarded to the entire range. All other scores awarded to these low-end models were in line with the vendor's averages.

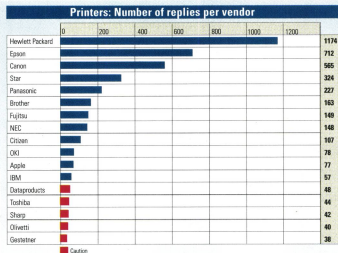
Users of 24-pin Brother models tended to be more satisfied with the product support they received, awarding 7.9 points compared with Brother's overall average of 6.7.

Despite this relatively high level of satisfaction with support (and the fact the overall reliability score was consistent with the vendor's average) only just over four out of five 24-pin users (81.8 per cent) said they would buy another Brother printer compared with the vendor's overall average score of 87.1 per cent.

Scores awarded to Brother's inkjet printers were in line with the overall averages recorded by the vendor.

Laser printers were marked down for product support with users awarding just 7.1 to express the ease with which support had been obtained. Satisfaction with product support was rated at 6.3, against Brother's overall average of 6.7. Despite these relatively low ratings, reliability and buy again scores were in line with the vendor's averages.

As mentioned above, Brother has not taken advantage of technological innova-



We received 4430 questionnaires with the printer section completed. This year we were able to take a detailed look at the performance of 17 vendors. The results published for five vendors are based on samples of less than 50 respondents and this should be remembered when interpreting results. Hewlett-Packard has enjoyed an exceptional growth in popularity and users of this brand of printer now account for over a quarter (26.5 per cent) of our sample. Epson held on to second place but is being challenged by Canon which has benefited from the popularity of its BubbleJet range of printers. The chart rankings are almost identical to last year, with Olivetti and Dataproducts added. The stable market and the domination of one vendor create a tough environment for new vendors.

tions to make technical support more freely available to the installed base. Should the company choose to listen to this feedback from the marketplace it will be a relatively simple (and inexpensive) procedure to introduce additional services (such as bulletin boards) in an effort to improve Brother's one weak score.

If the vendor finds a solution to this problem, as reported by existing users, then Brother should finish with an above average index in next year's survey.

CANON

FIVE POINT INDEX
8.1
RANK 7th

The Australian division of Canon was established in 1978. The company specialises in inkjet and laser printers, fax machines, copiers, typewriters, document storage systems and photographic equipment. In 1993, Canon Australia's sales revenue exceeded \$370 million, with 90 per cent accounted for by business machines. Canon recently achieved accreditation by Australian Standards AS3902.

In the printer business Canon has enjoyed enormous success with its BubbleJet range of printers, offering a low-cost alternative to laser printing. The company has claimed the BJ-10 range as the most popular printer range in Australia. Ideal for the SOHO and domestic markets, together with the executive seeking freedom from the shared LAN printer, Canon has managed to hold the lead in this increasingly significant

segment of the non-impact market.

Canon printers are supplied with a one-year parts and labour warranty. Free technical support is offered by phone and using an automated voice information line. A private bulletin board is also in operation.

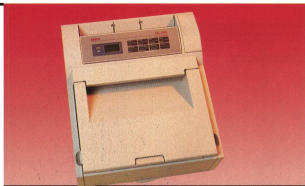
The third vendor to be listed in our alphabetical report was, by coincidence, the third vendor to tie for 7th ranking in our five point index. End users participating in our research awarded their (mainly BubbleJet) Canon printers scores, which gave the company an index of 8.1, 0.1 below the overall average.

In fact, all the scores awarded to Canon were almost exactly in line with the survey's overall average. It should be highlighted that this lacklustre result does not imply anything bad. Average results were obtained from the combined scores awarded by all 4430 respondents who took the time to tell us about their printers. Any score rated as average implies a perfectly acceptable product or service attribute.

Most of the Canon printers included in our survey this year were from the BubbleJet range. It is not surprising, due to the increasing number of BubbleJets entering the market, that the average age tended to be below the overall average. End users reported their Canon printer had been in use for 18.2 months, over nine months less than the overall average age of all printers included in the survey. Canon printers were the youngest included in our published results.

Canon accounted for 12.8 per cent of all the printers included in our survey. This level of participation illustrates Canon's success in the Australian market. Back in 1991, Canon printers accounted for just 3.9 per cent of the sample; by the following year that proportion had increased to 6.4 per cent and it reached 12 per cent last year.

The overall reliability of Canon printers was rated at 8.8, just 0.2 points short of the average and the score awarded last year. Well over nine out of 10 users (92.9 per cent) said they would buy another Canon printer, placing the vendor above a very high average, 91 per cent (established by the high scores awarded to the two market leaders, Hewlett-Packard and Epson). Canon was the only vendor, in addition to the two market leaders, to achieve an above-average brand loyalty rating.



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Just over a quarter of the Canon users participating in our research (27.6 per cent) said they had experienced a problem with their printer since purchase, just above the overall average of 23.9 per cent. A similar proportion had sought assistance from technical support (28.8 per cent), just slightly above the overall average of 27.2 per cent. This proportion was down significantly on last year's, 38.7 per cent.

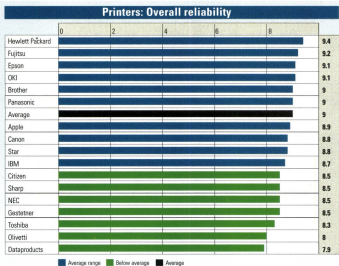
When asked to rate the ease with which product support had been obtained Canon users awarded 7.6 points, 0.1 below the overall average. This result was consistent with that awarded last year (7.7) but failed to match the top score of 8.3 awarded in our 1992 survey.

Satisfaction with product support was rated at 7.2, 0.2 below the overall average recorded by the survey. Previous results have all been in the range 7.4 to 7.5 for this same attribute. Repair service satisfaction was rated at 7.8, just 0.1 above the overall average. This result represents a significant improvement on the 6.6 awarded last year and marks an end to a negative trend away from the 1991 score of 7.3.

We received sufficient replies from Canon users to look at the scores awarded to laser printers separately from those awarded to inkjet users. As inkjet users made up the vast majority of the Canon sample it is not surprising that scores awarded by these users were in line with the overall averages awarded by all Canon users.

Laser users rated the overall reliability of their Canon printers at 9.2, 0.4 ahead of the company's average score. However, satisfaction with the product support offered to this group of users was below average, with end users awarding 6.7 points, half a point below the vendor's overall average. These two factors would appear to have effectively cancelled each other out as brand loyalty among laser printer users (89.2 per cent) was only marginally below that reported by all Canon users (92.9 per cent).

After-sales support is provided through the dealer channel and it is possible that the huge increase in demand for Canon printers has created problems for some dealers. Canon's results do not, as discussed above, imply a problem but as demand levels off, and dealers gear up to support the new level of installed base, Canon's overall result can only be headed one way.



On average all 4430 printer users participating in our research awarded 9 points to express the overall reliability of their printers, exactly the same score as awarded in our last two surveys. Hewlett-Packard took first place for the second time with a score of 9.4. Seven vendors were awarded scores of 8.5 or below compared with only 4 last year. Gestetner and Toshiba featured in the below average range for the second year running. The two newcomers, Olivetti and Dataproducts, gained weak scores.

CITIZEN

FIVE POINT INDEX
8.4
RANK 2nd

All the Citizen printers included in our survey were dot matrix printers, although the company has recently entered the laser market as well. Overall averages for this section of the survey are calculated from scores awarded to all types of printer, making Citizen's overall performance even more impressive.

We received sufficient response to look at the scores awarded to 9-pin models separately from those awarded to 24-pin models. However, no significant differences existed between the scores awarded to the two product categories.

With a Five Point Index of 8.4, only market leader Hewlett-Packard achieved a higher score. However, this impressive performance masks the fact Citizen excelled for after-sales support while scores awarded for attributes related to the printers themselves were in the below-average range.

Citizen users made up 2.4 per cent of our sample, down from 2.7 per cent last year. On average, the Citizen printers included in our analysis had been in use for 28.4 months, just one month longer than the overall average.

The overall reliability of Citizen printers was rated at 8.5, half a point below the overall average and a slight decrease on the 8.7 or 8.8 awarded in each of our three previous surveys.

Brand loyalty was also rated below average, with 85 per cent of users saying they would buy another printer from the

same vendor against the overall average of 91 per cent. However, this year's result has halted a negative trend with 90.4 per cent of end users saying they would buy again in 1991, 85.4 per cent in 1992 and 81.7 per cent in 1993.

Three out of 10 users (31.8 per cent) said they had experienced at least one difficulty with their printer since purchase, up on the average of 23.9 per cent. Roughly the same proportion of respondents (29.9 per cent) had sought product support against the overall average of 27.2 per cent.

When asked to express the ease with which product support had been obtained end users awarded 8.0 points, 0.3 above average. Last year, the vendor was awarded 8.9 points for this same attribute, the highest score awarded in the survey.

Citizen's performance in the section measuring satisfaction with after-sales services was nothing short of outstanding. This year, users awarded Citizen 8.0 points to express their satisfaction with product support, the highest score awarded to any printer vendor. Last year end users awarded just 6.2 points for this same attribute, down from 7.0 points in 1992.

At the end of 1992, the Australian distributor of Citizen printers, Pantek, was wound up and responsibility for existing warranties and distribution was taken over by Pancorp. However, it is surprising that this change in distributor has resulted in such a dramatic increase in performance as the two companies were closely related and Pancorp took over Pantek's staff.

Since we completed the fieldwork for this study (February 1994) the distribution and after-sales support liability has transferred yet again. Datamatic is now the exclusive distributor of Citizen printers and all after-sales support inquiries should be directed to them. It will be another year before we can assess if the new distributor can meet, or better, the standards set by the previous agents.

Repair service satisfaction was rated at an outstanding 9.2, by far the highest score awarded for this attribute. On average printer users rated their repair service experiences at just 7.7. Again, this result represents a remarkable turnaround with end users ranking Citizen dead last for this attribute last year, with a score of just five points. In 1992, the company earned a score of 6.5 for repairs.

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hardware, software, peripherals, connectivity equipment and
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- ☐ None ☐ \$20,000-\$99,999
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☐ \$500-\$9999 ☐ \$500,000-\$999,999
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4. How many microcomputers are you directly responsible for at work?

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☐ 20-49 ☐ 2000-4999
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reported their printers had been out of action for an average of 1.9 days, just 0.3 of a day less than the overall average downtime recorded by the survey.

These results suggest the most dramatic turnaround in after-sales service yet reported by the Service and Reliability Survey.

DATAPRODUCTS

**FIVE
POINT
INDEX**

7.6

RANK EQUAL 12th

With just 48 users of Dataproducts printers participating in our research, results are based on a relatively narrow band of opinion and this should be remembered when interpreting results.

Printers are supplied with a one-year onsite parts and labour warranty backed by free technical support, available by telephone. Dataproducts also operates a fax-back service and private bulletin board for users.

Dataproducts has been in Australia since 1984 and currently employs 26 staff. The company boasts an extensive range of printers from low-end dot-matrix to a 30ppm network printers. The company is a major supplier to the OEM market in addition to its own reseller channel.

In 1991/92, turnover reached \$23 million, representing a 38 per cent increase over the previous year. At the end of the 1993/94 financial year turnover grew to \$33 million.

Dataproducts failed to perform well in this year's survey with end users awarding scores which gave the vendor a Five Point Index of just 7.6, 0.6 below the overall average. Only three other vendors were awarded a lower index. The company was awarded very weak scores for attributes related to the printers themselves. Only strong scores for product support saved the vendor.

Dataproducts scraped into our survey results in 1991 and 1992 but was absent last year due to lack of response. The very fact that Dataproducts has made it back into the results should be cause for some celebration. This resurrection suggests increased market share during the past 12 months and it is, therefore, not surprising end users reported their printers had been in use for an average of 19.5 months, considerably less than the overall average of 27.4 months.

Dataproducts printers were ranked dead last for overall reliability with end users awarding a score of 7.9 points, 1.1 below the overall average.

In our first Service and Reliability Survey, conducted in 1991, end users ranked Dataproducts last for reliability with end users awarding a score of just 7.5. In 1992, the company did better with users awarding 8.6 points.

Only just over two out of three Dataproducts users said they would buy another printer from the same vendor again (68.8 per cent). Only one other vendor (Toshiba) achieved a lower brand loyalty rating (65.9 per cent). The average score awarded by all 4430 printer users participating in our research was 91 per cent, giving some indication of the problems this score could well present for Dataproducts.

In 1992, Dataproducts achieved a reasonable brand loyalty score with 88.1 per cent of users saying they would buy again. In 1991 only around three quarters of the sample (73.7 per cent) said they would buy another Dataproducts printer.

Exactly half the Dataproducts users participating in our research had experienced at least one problem with their printer since purchase. Nearly six out of 10 users (58.3 per cent) had cause to contact product support. No other vendor experienced a higher demand for product support.

These findings are consistent with our previous research. In 1991, 54.8 per cent of users had experienced a problem and two-thirds (66.7 per cent) of users had contacted product support. In 1992, 47.4 per cent reported a difficulty, while 52.6 per cent said they had sought assistance.

Despite the low reliability and brand loyalty scores and the relatively heavy demand for after-sales support end users awarded very respectable scores to ex-

press their satisfaction with the help they received.

Dataproducts users rated the ease with which support had been obtained at 8.3, the highest score awarded in the survey and, incidentally, the only score to rank in the above average category.

Satisfaction with product support was rated at 7.5, 0.1 above average, dissecting the scores awarded in our two previous surveys; 7.1 in 1991 and 8.0 in 1992. Repair service satisfaction was rated at 7.6, 0.1 below average. This rating was consistent with our 1992 finding, 7.4, and up significantly on the 6.1 awarded in 1991.

EPSON

**FIVE
POINT
INDEX**

8.2

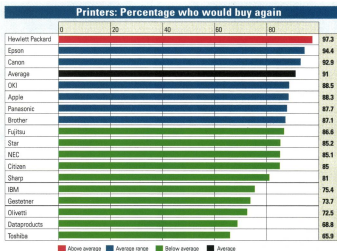
RANK EQUAL 4th

In our first Service and Reliability Survey, in 1991, Epson users accounted for a massive 27.7 per cent of the sample. The overwhelming majority of users reported on dot-matrix printers and the company was awarded excellent scores for attributes related to the printers and average scores for product support.

As the market swung toward non-impact printers Epson's market share began to slide. By 1992, Epson users accounted for 18.9 per cent of the sample. It should be noted that this score understates Epson's share of the installed base at that time as the 1992 sample included a disproportionately high number of Apple users (due to the inclusion of sister publication *MacUser* readers in our sample).

Last year, Epson users accounted for 17.7 per cent of the sample and the company no longer enjoyed the largest share of the installed base, with non-impact specialist Hewlett-Packard taking over at the top. This year the decline continued, with Epson users accounting for 16.1 per cent of all the printer users participating in our research. As further evidence of Epson's declining market share end users reported their printers had been in use for an average of 36.1 months, nearly 11 months longer than the overall average.

Epson has not been oblivious to the shift in the market and has produced a diverse range of non-impact printers. In previous surveys, however, end user experiences of Epson's laser printers have not matched the standards of excellence set by the impact models. Such feed-



Hewlett-Packard obtained the highest brand loyalty rating for the fourth year in a row. Virtually all the 1,174 users of HP printers said they would buy another from the same vendor. Epson ranked second for this attribute for the third time in four years. Last year only 6 vendors achieved below average status compared with 10 this year. NEC, Citizen, IBM, and Toshiba featured in this ranking for the second consecutive year. Toshiba's loyalty rating fell from four out of five users (80.6 per cent) to just two out of three (65.9 per cent).

back from the installed base cannot have helped sales in this growing market segment. This year, only the score awarded for the overall reliability of Epson's laser printers failed to match the average vendor rating.

Seiko Epson has been in Australia in its own right since 1983. The company offers a complete range of output devices and claims to be having success in building sales in the growing inkjet and laser markets.

Epson printers are supplied with a one-year parts and labour warranty with high-end laser printers qualifying for onsite maintenance during this time. Free technical support is available by telephone for the life of the printer. A free private bulletin board service is also provided together with a forum on Oz-E-Mail.

Overall, Epson performed well as usual with our five point index awarding the vendor 8.4 marks, the fourth highest score.

Epson users rated the overall reliability of their printers at 9.1, the third highest score recorded by the survey. In both 1991 and 1992, Epson was awarded exactly the same score for this critical attribute, while last year end users awarded 9.3 points.

Despite the evidence to the contrary virtually all the Epson users participating in our research (94.4 per cent) said they would buy another printer from the same vendor. This was the second highest brand loyalty rating recorded by the survey, just under three per cent below market leader Hewlett-Packard's score.

Epson has always achieved a high buy-again score; 92.2 per cent last year, 94.7 per cent in 1992, and 93.4 per cent in 1993. However, experience shows that in Epson's case this score is merely an indicator of customer satisfaction rather than a true predictor of purchase intentions.

Only 16.1 per cent of Epson users reported experiencing at least one difficulty with their printer since purchase, the lowest proportion of problems reported by end users. Demand for product support was correspondingly low with just 17.4 per cent of users seeking assistance compared with the overall average of 27.2 per cent. Both these scores represent an outstanding achievement by Epson, made more remarkable by the relatively old average age of the printers.

As has become the tradition, scores awarded for after-sales experiences did not match the standard of excellence set by those awarded to attributes related to the printers themselves. It should be highlighted that none of Epson's scores were out of the average range and therefore do not imply a significant problem with after-sales support.

To express the ease with which support had been obtained end users awarded 7.7 points, exactly in line with the survey's overall average. This score was similar to

that achieved in 1991, 7.5, and a significant improvement on the 6.8 awarded in our last two surveys.

Satisfaction with product support was rated at 7.4, again exactly in line with the overall average. As with access to support, end user experiences were similar to those reported in 1991, when users awarded a score of 7.1. Last year, Epson was awarded 6.9 for this attribute, up from the 6.6 awarded in 1992.

Repair service satisfaction was rated at 7.4, 0.3 below the overall average. This score represents an abrupt end to a significant declining trend. In 1991 end users awarded just 6.5 points, followed by 6.2 in 1992 and 5.9 last year.

In addition, end users reported their printers had been out of action for an average of just 1.1 days during the last year, exactly half the overall average downtime recorded by the survey. Again, this score is made more remarkable when the average age of the Epson printers included in our survey is considered.

We received sufficient response from Epson users to look at scores by product category. Users of low-end 9-pin models were slightly happier with their after-sales experiences, awarding 8.3 to express the ease with which product support had been obtained and 7.7 for satisfaction with product support. These scores compare with vendor averages of 7.7 and 7.4 respectively. This higher level of satisfaction did not, however, have a significant impact on the already high brand-loyalty rating.

We heard from 353 users of 24-pin Epson printers, making up the largest subset of users. Results calculated from these respondents were in line with the overall averages awarded to the vendor.

Inkjet printers made by Epson achieved scores significantly below the standard of excellence set by the vendor's overall scores. For overall reliability, Epson inkjets were awarded 8.6 points, half a point below the vendor's overall average. Users rated the ease with which they had obtained support at just 6.9, well below the 7.7 awarded to the vendor overall.

Satisfaction with support given to inkjet users rated even worse with end users awarding just 5.6 points, 1.8 below the overall average. Only just over four out of five users (83.3 per cent) said they would buy another Epson inkjet printer, well down on the vendor's overall brand loyalty score of 94.4 per cent.

Users of Epson laser printers awarded just 8.6 for overall reliability, half a point short of the vendor average. All other scores awarded by laser printer users were in line with the vendor's average scores.

Overall, this year's results do represent good news for Epson, maintaining excellent results for attributes related to the printers

themselves, while improving the after-sales service rating. In addition, the company claims to have recently completed a 'clean-up' and restructuring of authorised repair centres which will lead to improved turnaround times for repair services.

FUJITSU

**FIVE
POINT
INDEX**
8.2
RANK EQUAL TO

Overall, Fujitsu printers performed well in this year's Service and Reliability Survey, with our Five Point Index calculating a score of 8.2, the fourth highest recorded.

Fujitsu has been in Australia since 1972 and merged with British-based ICL in April 1992. Fujitsu Australia is part of a \$30 billion worldwide multinational operation which is currently ranked at 42 in the *Fortune 100* league of the world's largest organisations. The company focuses on supercomputers, mainframes, minicomputers, semiconductors and telecommunication equipment.

Fujitsu printers are supplied with a three-month parts and labour warranty supported by free technical support available by telephone. A bulletin board service is available via CompuServe. No other support options are currently provided by the vendor, however a range of fee-based services is available.

Fujitsu users accounted for 3.4 per cent of the sample, however this response rate will probably be a disappointment for Fujitsu, which had previously enjoyed a steady increase in the installed base, from 2.7 per cent in 1991 to 3.9 per cent last year. The overwhelming majority of the Fujitsu printers included in our analysis were 24-pin dot-matrix printers.

The overall reliability of Fujitsu printers was rated at 9.2, just 0.2 above the overall average, but the second highest score awarded in the survey. In both 1991 and 1992, Fujitsu was rated as the supplier of the most reliable printers, achieving scores of 9.2 and 9.5 respectively. Last year, end users awarded their Fujitsu printers a score of nine for this critical attribute.

Despite this high rating for reliability, a below average proportion of end-users said they would buy another Fujitsu printer. On average, 91 per cent of all 4430 respondents participating in our research said they would buy another printer of the same brand compared with just 86.6 per cent of Fujitsu users.

In 1992, when Fujitsu achieved a high score of 9.5 for reliability, 95.6 per cent of users said they would buy another printer from the same vendor. This was up from the 90.6 per cent of users who gave this response in 1991. Last year, this important indicator of brand loyalty rated Fujitsu at

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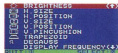
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84.6 per cent.

Considering the relatively high score achieved for overall reliability it is surprising to note that just over a quarter of Fujitsu users (26.2 per cent) reported experiencing at least one difficulty with their printer since purchase. This proportion was in line with the average (23.9 per cent) but high in comparison with top performers; for example, just 16.6 per cent of Epson users who reported a problem.

Demand for product support for Fujitsu printers was relatively high as well, with three out of 10 users (30.9 per cent) seeking assistance. Again, this result was in line with the overall average (27.2 per cent), but high relative to the proportionate demand experienced by companies like Epson (17.4 per cent).

The ease with which product support was obtained scored well with end users awarding 7.8 points, 0.1 above the overall average. This result was exactly the same as the score awarded last year. In 1991, users awarded just 7.2 for this attribute and followed it up with a score of 7.5 last year. Users of 24-pin models reported slightly more positive experiences in obtaining product support; awarding a score of 8.2 points, compared with the vendor average of 7.8. This was the only product category score to significantly differ from Fujitsu's overall average.

Satisfaction with product support was also rated in the average range with users awarding a score of 7.3, just 0.1 below the overall average. Back in 1991, end users awarded just 6.4 to express their satisfaction with support, the second lowest score recorded in the survey. By 1992, the vendor would appear to have improved the situation with end users awarding 7.7 points for the same attribute, the second highest score recorded in the survey. Last year, Fujitsu was awarded 7.6, the highest score achieved in our 1993 printer survey.

Repair service satisfaction was rated at 8.0 points, placing Fujitsu at the top of the average range. In 1991, Fujitsu was awarded just 5.7 for this same attribute and last year end users awarded just 5.0 points, the lowest recorded by the survey. In 1992 however, repair service satisfaction was rated at 7.5, one of the best scores awarded in the survey. With an average of 1.9 days out of action Fujitsu printers ranked in the average range for downtime.

The variable results awarded by Fujitsu users to express their satisfaction with after-sales sup-

port would suggest that dealer supplied services are patchy. Should the vendor choose to attempt to locate problematical dealers and take action to improve the service offered, then Fujitsu will achieve an overall result worthy of the standard set by the printers themselves.

GESTETNER

FIVE POINT INDEX 7.8

RANK 12th
Our Five Point Index gave locally manufactured Gestetner printers a score of 7.8, 0.4 below the overall average awarded by all printer users participating in this year's Service and Reliability Survey.

We only heard from 38 Gestetner laser printer users, therefore results reflect a relatively narrow band of opinion, and this should be remembered when interpreting results.

The company was recently (February 1994) taken over by Lexmark Pacific, which has inherited the after-sales support liability associated with the existing installed base along with the brand name. Please note fieldwork for this survey was conducted during February 1994 and, therefore, results associated with both the products themselves and the after-sales support provided, refer to Gestetner itself.

The overall reliability of the Gestetner printers included in our study was rated at 8.5, half a point behind the overall average. Gestetner was first included in our published findings in 1992 when users awarded the same score for reliability. Last year, users awarded just 8.3 for this critical attribute, one of the lowest scores recorded.

Less than three quarters of the sample (73.7 per cent) said they would buy another Gestetner printer, well down on the overall average of 91 per cent who said they would stay with their brand. This result will be disappointing to the company having achieved scores of 87.5 per cent and 83.1 per cent in our two previous surveys. Only three other vendors achieved weaker brand loyalty ratings in this year's survey.

Explaining these low scores, well over four out of 10 users (44.7 per cent) said they had experienced at least one problem with their printer since purchase. Gestetner users were nearly twice as likely as average (23.9 per cent) to have experienced a problem. These negative experiences translate to a relatively high demand for after-sales support. Nearly half the Gestetner users surveyed (47.4 per cent) said they had sought product support. Only one other vendor experienced a proportionately higher demand.

The high incidence of problems and associated high demand for product support are consistent with the findings of our two previous surveys.

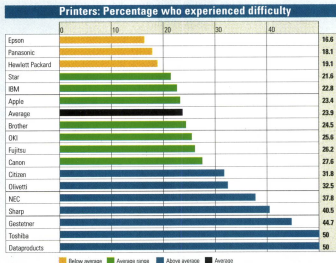
Gestetner would not appear to be experiencing any difficulty in meeting the demands of their end users. A score of 7.9 was awarded to express the ease with which product support had been obtained, 0.2 above the overall average. Again these findings are consistent with previous results: 7.8 last year and 8.1 in 1992.

Product support satisfaction was rated at 7.5, 0.2 above the overall average and exactly the same score as achieved last year.

In 1992, end users awarded the company 6.7 for this same attribute. Last year, the awarded score was sufficient to rank the vendor first for supplying support. This year, however, users reported a general increase in their satisfaction with support received and five other vendors were awarded higher scores for their efforts in this department.

When asked to rate their satisfaction with repair services Gestetner users awarded 7.6 points, just 0.1 below the overall average. This score represents a significant improvement on the 6.5 awarded in 1992 when we last received sufficient response to rate this service. End users reported their printers had been out of action for an average of 1.8 days during the past year, nearly half a day less than the overall average.

This vendor would appear



Almost one in four users reported experiencing at least one difficulty with their printer since purchase.

This proportion was consistent with last year's finding, 25.3 per cent. Epson, Panasonic and Hewlett-Packard occupied the top three positions for the second year running. This year IBM users were significantly less likely to report a problem, down from 37.5 per cent last year to just 22.8 per cent. Similarly the proportion of Apple users experiencing a problem fell from six out of 10 (61 per cent) last year to just under one in four (23.4 per cent)

to have improved and maintained standards of after-sales support. However, Gestetner printers would appear to still be causing their users more than their fair share of problems and the vendor needs to address this issue to gain an improved performance in our next survey.

HEWLETT-PACKARD

FIVE POINT INDEX **8.6**

RANK 1st There can be no doubt Hewlett-Packard (HP) now dominates the printer market. In response to our first Service and Reliability Survey, we heard from just 207 HP printer users accounting for 10.3 per cent of the sample. Both Epson and Star had larger shares of the installed base at that time.

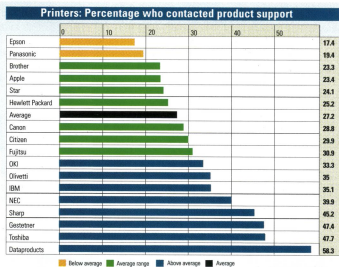
By 1992, HP accounted for 18.3 per cent of the printer sample and only Epson had a larger share of the user base. Last year, HP accounted for 17.8 per cent of the sample, exactly equal to Epson's share. This year, we heard from a staggering 1174 HP printer users, representing 26.5 per cent of the sample. In second place, Epson managed just 16.1 per cent.

Reflecting the high number of new printers being acquired by the installed base, the average age of Hewlett-Packard printers was just 19.1 months, nearly eight months younger than the overall average.

In addition to the enviable growth rate HP achieved a marvellous set of results in this year's survey. Our Five Point Index awarded the company 8.6 marks, the highest score awarded to any of the 17 printer vendors included in this year's published findings.

Hewlett-Packard has been represented in Australia since 1967. It is part of an American multinational with a presence in 110 countries and a \$US20 billion annual turnover. In addition to computers and peripherals, the company makes test and measurement instruments, analytical products and electronic medical equipment.

HP supports its laser printers with a one-year parts and labour warranty. DeskJet printers (except the DJ Portable and DJ1200c) are supported by a three-year parts and labour warranty. The two exceptions are supplied with a one-year warranty. The company provides a technical support telephone line which is available free of charge to customers for one year from the date of purchase. After this time, support costs start at \$25 per incident. A



Proportionate demand for product support appears to be in decline, down from 33.9 per cent in 1991 to 27.2 per cent this year

fax-back service and private bulletin board are also supported.

For overall reliability, HP users awarded 9.4 marks, the highest score awarded in this section of the survey. Considering the enormous response rate, this is an outstanding achievement. This high level of satisfaction was reflected in the brand loyalty indicator. Virtually all HP users (97.3 per cent) said they would buy another printer from this vendor; again the highest score awarded.

These scores are remarkably consistent with previous findings — last year, users awarded 9.4 for reliability and 97.2 per cent said they would buy again from Hewlett-Packard. In 1992, users again awarded 9.4 for reliability, while 98.3 per cent said they would buy again. Finally, in our first survey, 1991 participants awarded 9.1 for reliability and 95.5 per cent of respondents said they would remain loyal to the non-impact specialist.

As would be expected from such high scores problems were relatively few and far between. Less than a fifth of users (19.1 per cent) reported experiencing any difficulty with their HP printer, well down on the overall average of nearly one in four (23.9 per cent).

One in four HP users (25.2 per cent) had cause to contact product support, just below the overall average of 27.2 per cent. Those who had cause to seek assistance reported more positive experiences than in the past. The ease with which support was obtained was rated at 8.1, an insignificant 0.2 behind the top score. Last year, users awarded just 7.6 for this attribute, up from 7.5 in 1992 and down from the 7.8 awarded in 1991.

Satisfaction with the product support offered would also appear to have improved, with users awarding 7.8 points,

again just 0.2 behind the top score. This result is particularly significant for HP as it marks the end of a negative trend. In 1991, users awarded 7.5 to express their satisfaction with product support; the score fell to 7.1 the following year and bottomed at 6.5 last year.

The company has always done well for repair services with HP users consistently awarding scores at or near the top of the range. In 1991, users awarded 7.4, followed by 7.8 in 1992 and 8.2 last year. This year the score remained consistent with last year (8.1), however a general increase in the scores awarded for this attribute meant the HP score was over a point behind the leader.

Repair services were ranked right at the top of the average range and this was reflected in the average downtime indicator. Hewlett-Packard users reported their printers had been out of action for an average of just 1.2 days, a day less than the overall average.

The general standard of excellence reflected in the scores awarded by HP users is creating a tough act for other vendors to follow. HP now controls such a lion's share of the market that the scores awarded to this vendor go a long way towards establishing the overall averages to which all other vendors are compared. Readers will notice that, in comparison to the PC and monitor sections of this report, relatively few vendors feature on the positive side of the average mark for many of the attributes surveyed. The high scores awarded to Hewlett-Packard go a long way toward explaining this.

IBM

FIVE POINT INDEX **7.9**

RANK 11th

Company information for the founder of the PC industry can be found in the PC and monitor sections of this article. IBM supports its products with parts and labour warranties of between one and three years. Technical support is available free, during the warranty period, by telephone, although Big Blue has fallen behind in that it has not taken advantage of technological innovations to support clients. No fax-back services, automated voice information telephone lines or bulletin boards are supported.

IBM would appear to be faced with relatively flat demand for its printers, judging by the results from this year's Service and Reliability Survey. This year, we heard from 57 users of IBM printers, accounting

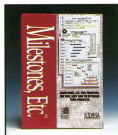
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for 1.3 per cent of the sample, exactly the same proportion as in our first survey, conducted in 1991.

Overall, the company finished 11th in our five point ranking with end users awarding scores which gave IBM an index of 7.9, 0.3 below average.

The overall reliability of IBM printers was rated at 8.7, 0.3 behind the overall average. This result was consistent with the scores awarded in our two previous surveys; 8.5 last year and 8.8 in 1992. In our first survey, IBM printers were awarded just 8.0 points for this critical attribute.

Of particular concern to IBM should be the fall in the proportion of respondents who reported they would buy another printer from IBM. In 1991, 87 per cent of users said "yes" to this important brand loyalty indicator and this improved to 90.8 per cent the following year. Last year, however, the score fell dramatically, to just under four out of five users (79.2 per cent) and this year's result fell to three out of four users (75.4 per cent). IBM now ranks among the bottom five printer vendors in the brand loyalty table.

From the statistics alone it is difficult to account for the collapse in the brand loyalty indicator. Less than a quarter of IBM users (22.8 per cent) reported experiencing any difficulty with their printer since purchase and this was in line with the overall average (23.9 per cent).

Demand for product support was slightly above average — 35.5 per cent compared with 27.2 per cent — but this result is hardly sufficient to cause concern. In addition, end users rated their after-sales experiences on the positive side of average.

When asked to rate the ease with which product support had been obtained IBM users awarded 8.0 points, 0.3 above the overall average. This was a good result for IBM, halting a negative trend established during previous surveys. In 1991, users awarded 8.3 to express the ease with which they had obtained assistance and this fell to 8.3 in 1992 and bottomed at just 7.0 last year.

Satisfaction with the product support received was rated at 7.8, an indistinguishable 0.2 below the top score. This score was consistent with those awarded in our first two surveys (7.7 and 7.6 respectively), but represented a significant improvement on the 6.6 awarded last year.

Repair service satisfaction was rated at 7.7, exactly in line with the survey's overall average. Again, this result was consistent with those awarded in 1991 and 1992 (7.8 and 7.9 respectively) and significantly up on the 6.1 awarded last year. It should however, be remembered that the overall average for this attribute is up nearly a point on previous years and, therefore, IBM's

ranking for repair service satisfaction is falling. The IBM printers included in our analysis had been out of action for an average of 1.2 days, a day less than the overall average.

The results awarded by IBM laser printer users were significantly better than those awarded by the wide variety of users included in the vendor's overall average score. The overall reliability of laser printers was rated at 9.2, half a point up on the vendor's average. In addition, users rated the ease with which product support had been obtained at 8.8, 0.8 above IBM's average. Satisfaction with product support also fared better, with users awarding 8.6 points, 0.8 above the vendor average.

These improved scores were reflected in the brand loyalty indicator, with 84.6 per cent of laser printer users saying they would buy another IBM printer compared with just 75.4 per cent of all IBM users.

As the market is rapidly shifting toward non-impact printers IBM can take some comfort in the improved scores awarded to the products competing in this market

NEC

FIVE
POINT
INDEX 7.6
RANK EQUAL IBM

NEC printers are supplied by NEC Information Systems, details of which are given in the PC section. In June 1990 'Datamation 100' ranked NEC as the world's number 10 supplier of computer peripherals. NEC printers are supplied with a one-year parts and labour warranty with an option to extend for an additional two years. Fee-based maintenance contracts can be negotiated after this time. Free technical support is provided over the phone (008 number) and by private bulletin board. A quarterly newsletter containing product and technical information is also available.

The NEC printers included in our analysis had an average age which was older than any other brand. End users reported their NEC printers had been in use for an average of 43.6 months, 16.2 months longer than average.

A significantly older than average age is a good indicator of declining market share and in NEC's case there is no exception. Back in 1991, NEC users accounted for 9.1 per cent of our first printer sample. The vendor was the fourth most well represented in our sample. By 1992, that proportion had dropped significantly to 5.5 per cent. The following year NEC users accounted for 4.3 per cent of the sample, while this year that proportion is down to just 3.3 per cent.

To achieve such a dramatic drop in

usage implies an even more dramatic decline in sales. Analysis of the sample reveals a comparatively low proportion of NEC non-impact users suggesting this vendor has so far failed to make a significant impact on this important market segment.

Consistent with previous surveys, NEC printers did not perform well. Our Five Point Index awarded a score of 7.6, sufficiently weak enough to rank the vendor among the five printer suppliers rated as below average.

For overall reliability, end users awarded 8.5 points, half a point below the overall average. Results obtained from our three previous surveys have all been in the range 8.1 to 8.6.

On average, just over nine out of 10 (91 per cent) of all the 4430 printer users participating in our research said they would buy another printer from the same vendor. NEC did not rate far behind this average with 85.1 per cent of current users indicating they would remain brand loyal. This result was on the positive side of previous scores, which all fell in the range 80.3 per cent to 84.1 per cent.

Given their relatively advanced age it is not surprising that NEC users were more likely than average to have experienced a problem with their printer since purchase. In fact, nearly four out of 10 NEC users (37.8 per cent) reported a problem, compared with the overall average of just under one in four users (23.9 per cent).

Demand for product support was correspondingly above average with four out of 10 users (39.9 per cent) saying they had sought assistance, compared with the overall average of 27.2 per cent.

The ease with which NEC users obtained assistance was rated at 7.1, over half a point below average. In fact, only one other vendor achieved a lower result for this attribute. Similarly, satisfaction with the support obtained was rated at 6.6 points, 0.8 below average. NEC ranked in the bottom three suppliers of product support.

These results are again consistent with previous findings. Scores for ease with which product support was obtained have all been in the range 6.8 to 7.1. The scores awarded for satisfaction with product support itself have all fallen in the range of 6.3 to 6.6.

Repair service satisfaction was rated at 7.3, placing NEC right at the bottom of the average range. However, this was a good result for the vendor having achieved a score of 5.7 in both 1991 and 1992, falling to 5.6 last year. In addition, users reported their printers had been out of action for an average of 2.6 days during the past year. Although this was 0.4 of a day above average, it is a good result considering the average age of the NEC printers included in our analysis.

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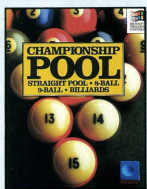
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users of NEC printers to look at the replies from 24-pin dot-matrix printer users and laser printer users in isolation. Users of 24-pin models awarded a slightly higher score to express their satisfaction with product support: 7.0 against the vendor average of 6.6. Additionally, a slightly higher proportion of 24-pin users said they would buy another NEC printer—90.7 per cent compared with the vendor average of 85.1 per cent.

Laser users rated the overall reliability of their printers at just 7.2, down significantly on the 8.5 achieved by the vendor overall. Satisfaction with product support provided was also rated below the vendor's average (6.6) with laser users awarding just 5.4 points. Together, these factors help explain the lower brand loyalty score awarded by NEC laser printer users. When asked if they would buy another printer from the same vendor, only seven out of 10 laser users (70.4 per cent) said they would compared with the vendor average of 85.1 per cent.

Only a relatively small number of replies were received from non-impact users which prevented these lower scores having a serious impact on NEC's overall result. As the market continues to move toward non-impact output devices NEC needs to address the issues raised by this analysis.

OKI

FIVE
POINT
INDEX

8.3

RANK

3rd

OKI printers are distributed in Australia by IPL Datron. Oki's non-impact printers incorporate LED technology, which use very few internal moving parts. The company recently released the OL400e, the first laser-quality printer in Australia to break the \$1000 barrier.

The impact range of printers has recently seen the introduction of the ML500 series, which incorporates technology to eliminate the head gap lever by measuring and adjusting the paper settings automatically. IPL has achieved Australian Standard's AS3902 accreditation and had gained access to the government market. IPL is also accredited to the International Standard ISO 9002.

OKI printers are supplied with a one-year parts and labour warranty with the LED head guaranteed for five years (if applicable). Technical support is available free by phone for the life of the product. A fax-back service together with public and free private bulletin boards are also sup-

Printers: How easy to contact support?



The ease with which product support was obtained was rated at 7.7, up from 7.5 in the last two surveys. Newcomer Dataproducts stormed to the top rated position with a score of 8.3, despite the relatively high demand for support

plied. IPL provides technical support with the assistance of Oki authorised service agents.

In 1991, Oki users accounted for three per cent of the printer sample in our first Service and Reliability Survey. In both the following two years, Oki users accounted for 2.3 per cent of the sample. This year, that proportion decreased to 1.8 per cent. In addition, with an average age of 31.6 months, Oki printers were slightly older than the overall average of all the printers included in our analysis (27.4 months). Taken together, these factors suggest Oki is losing market share, despite the fact it produces both dot-matrix and laser printers.

This decrease in market share is difficult to understand given the excellent set of results awarded by users of Oki printers. Overall, the sample awarded scores which delivered Oki a five point index of 8.3, the third highest recorded in this year's survey. Oki performed particularly well for after-sales support.

The overall reliability of Oki printers was rated at 9.1, just above the overall average, 9.0. This was a good result for Oki as previous ratings have fallen in the range 8.3 to 8.7. When asked if they would buy another Oki printer, 88.5 per cent of current users said they would, just 2.5 per cent short of the overall average. This important indicator of brand loyalty was in line with previous results, which have all fallen in the range 87 to 89.7 per cent.

Despite their slightly longer than average period of usage, Oki printers were not significantly more likely than average to have caused their owners problems. Only just over one in four users (25.6 per cent) reported experiencing at least one problem with their Oki printer since pur-

chase, and this was only just above the overall average of 23.9 per cent.

Demand for product support was only just above average, with one in three Oki users (33.3 per cent) saying they had sought assistance compared with just over one in four (27.2 per cent) of the overall sample.

The ease with which product support had been obtained was rated at 7.6, an insignificant 0.1 below the overall average. In our first survey, end users only awarded Oki 6.8 for this attribute, but the results from the following two surveys (7.9 in 1993 and 8.0 in 1992) are consistent with this year's finding.

Product support satisfaction was rated at 7.6, 0.2 above average. Interestingly, in 1991 Oki achieved a score of just 6.4 for this attribute and roughly the same score (6.5) was awarded in 1993. In 1992, end users awarded Oki 7.4 to express their satisfaction with product support, a score which has been bettered in this year's findings. These fluctuating results could be accounted for by 'patchy' support from the dealer channel.

Results awarded for repair service satisfaction have been following a positive trend. In 1991, users awarded just six points for this attribute and that score increased to 6.6 the following year. Last year, Oki users awarded 7.3 points, while this year the company increased its score to 8.5. Oki achieved the second highest score for repair services in this year's survey, 0.8 above the overall average.

We received sufficient response from Oki printer users to look at the results broken into three product categories. Users of 9-pin dot-matrix printers made by Oki rated the ease with which product support had been obtained at 8.2, well up on the 7.6 awarded to the vendor overall. Conversely, 9-pin users tended to be less satisfied with the product support they received, awarding 7.2 against the vendor average of 7.6. These differences did not affect brand loyalty rating.

Scores awarded to 24-pin models were in line with the average scores awarded to all Oki printers.

Laser printer users awarded 8.6 points to express the ease with which they obtained product support, well up on the vendor's average of 7.6. In addition, this group of users was more satisfied with the support they received, awarding 8.4 points against Oki's average of 7.6. Together, it

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would appear, these improved scores had a significant effect on the brand loyalty indicator. Over nine out of 10 (93.1 per cent) Oki laser printer users said they would buy again from this vendor, compared with 88.5 per cent of all Oki users.

OLIVETTI

FIVE POINT INDEX 7.2*

RANK 16th

Company information on Olivetti is given in the PC section of this article. Olivetti printers are supplied with a three years parts and labour warranty. A free technical support line is available to users for 10 years from the date of purchase.

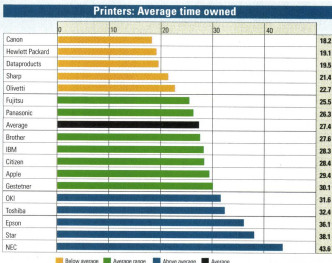
Olivetti has only been included in the printer section of our Service and Reliability Survey once before, in 1992. The company performed badly then and has repeated the performance this year, achieving below average scores for all the attributes surveyed.

Our five point index awarded this European manufacturer just 7.2 points, a full point below the overall average and the second weakest score recorded by the survey. It should be noted that we received insufficient response to rate Olivetti's repair services in their own right, and we therefore awarded an average score to calculate the index. This methodology may well have inflated Olivetti's result. It should also be highlighted that only 38 users of Olivetti printers participated in our research and results do, therefore, represent a relatively narrow band of users opinion. This fact should be considered when interpreting results.

The Olivetti printers included in this analysis tended to be relatively young. End users reported they had been using their Olivetti printer for an average of 22.7 months, nearly five months less than the overall average.

The reliability of the Olivetti printers included in our survey was rated at just eight points. This score is an insignificant 0.1 above the lowest score awarded and a full point below the overall average. Incidentally, the company was awarded exactly the same score in our 1992 survey. Inkjet printer users rated the reliability of their output devices at just 7.6.

Less than three out of four users (72.5 per cent) said they would buy another Olivetti printer, nearly 20 per cent less than the overall average of 91 per cent. Olivetti



On average the printers included in our survey had been in use for 27.4 months, just 0.2 months longer than reported last year. For the second year running Canon printers were the youngest in our survey, at just over a year and a half old

achieved the third lowest result in this important indicator of brand loyalty. This result was, however, an improvement on the 65.6 per cent of respondents who gave this reply in our 1992 survey.

One in three Olivetti users (32.5 per cent) reported experiencing at least one problem with their printer since purchase and a similar proportion (35 per cent) said they had contacted product support. Both scores were substantially above average — 23.9 per cent and 27.2 per cent respectively.

The ease with which product support was obtained was rated at just 6.8, the lowest score awarded in this section of the survey. In 1992, Olivetti was also ranked dead last for this attribute with a score of 6.4.

Product support satisfaction fared slightly better with end users awarding 6.7 points, the fourth lowest score and 0.7 below average. Back in 1992, the company was only awarded 5.5 for this attribute, the weakest score recorded.

Unfortunately, insufficient response was received to rate Olivetti for repair service offerings. However, end users reported their printers had been out of action for an average of just 0.7 days during the past year, the lowest down time recorded in the survey.

Despite the small sample size there can be little doubt that Olivetti users are not overly impressed with their printers or satisfied with the after-sales support they have been offered. It is interesting to note that Olivetti does not make available any of the after-sales support options made available by new technology. For example, a bulletin board could be established with a minimum of effort which would, undoubtedly, improve the score

awarded for access to product support.

It is up to the vendor to decide if it wishes to act on this feedback from the installed base or ignore it. To remain a contender in this increasingly competitive market this vendor, who is no stranger to trading in adverse conditions, needs to listen to the existing client base.

PANASONIC

FIVE POINT INDEX 8

RANK 10th

Panasonic is part of the Japanese-based Matsushita Electric Industrial Company. The brand has been represented in Australia (along with National and Technics products) since 1962 with the distributor changing its name to

Panasonic Australia in 1988. Panasonic printers are supplied with a one-year parts and labour warranty. Impact printers are covered by a back to base policy, while laser users enjoy onsite maintenance. A free technical support phone line is available to handle "operation difficulties" while technical failure is handled by authorised service centres.

Panasonic users accounted for 5.1 per cent of our printer sample this year. The overwhelming majority of users reported on dot-matrix printers (201 out of 227). Although Panasonic's share of the installed base was down on the 7.4 per cent reported last year, it remains ahead of the 4.9 per cent achieved in 1991. The Panasonic printers were not significantly older than the overall average recorded by the survey, another factor which can suggest declining market share.

Overall, Panasonic achieved scores in line with or better than average. Only the score awarded for repair service satisfaction brought the company's overall score down. Our Five Point Index calculated a score of exactly eight points, 0.2 below the high average awarded by all 4430 printer users participating in our research.

For the critical attribute overall reliability end users awarded 9.0 points, exactly in line with the overall average. In both our first two Service and Reliability Surveys, end users rated the reliability of their Panasonic printers at 9.1. Last year the company was awarded the same score as it achieved this year, exactly nine points.

Panasonic continues to enjoy a healthy brand loyalty indicator with 87.7 per cent of respondents saying they would buy again from this vendor. However, this result was slightly below the scores

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achieved in our previous three surveys (in the range of 88.4 per cent to 93 per cent) and Panasonic was rated 3.7 per cent below average.

In the past, Panasonic printers have performed exceptionally well in real-life situations, with a very low proportion causing their users problems. This year, just 18.1 per cent of users reported experiencing at least one problem with their printer since purchase. Only the users of Epson printers were less likely to report a problem (16.6 per cent).

This low incidence of problems translated into a relatively low demand for product support. Just under a fifth of the Panasonic users participating in our research (19.4 per cent) said they had contacted product support against an overall average of 27.2 per cent. Only Epson users were less likely to have sought assistance (17.4 per cent).

As reported in our first two surveys these results suggest you can take Panasonic printers out of the box and comfortably expect to plug them in and get them going without difficulty. However, again in line with our previous findings, some aspects of dealer supplied after-sales support leave something to be desired.

Panasonic users did not report difficulty in obtaining product support with end users awarding 7.7, exactly in line with the overall average. However, this result halted the positive trend in results awarded for this attribute. In 1991, Panasonic users awarded 7.3 to express the ease with which they had obtained help, followed by 7.6 in 1992 and exactly 8.0 points last year.

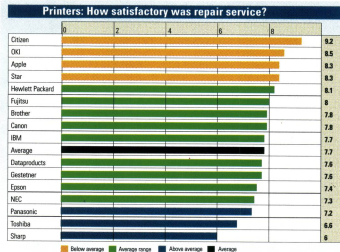
Product support satisfaction scores followed a similar pattern with end users awarding Panasonic just 6.5 in 1991, 7.2 in 1992 and 7.4 last year. This year, end users awarded 7.4, exactly in line with the overall average.

Panasonic can congratulate itself on its repair service satisfaction scores. In 1991, users awarded just 4.5 points to express their satisfaction with repair services. This was the lowest score achieved in our first survey. By 1992 Panasonic's score increased to 6.5 and was followed by 6.8 last year. This year, users awarded 7.2, continuing the positive trend enjoyed by this vendor. However, it should be noted that the average for this attribute has increased significantly over time (as discussed in the introduction to this section). Panasonic's score remains half a

point below average and the vendor was ranked in the bottom three suppliers of repair services.

Despite this relatively weak score Panasonic users reported their printers had been out of action for an average of just 1.2 days, a full day less than the overall average downtime reported by the survey.

We received sufficient replies from Panasonic users to look at results broken down by three product categories. Results



There has been a dramatic increase in satisfaction with printer repair services during the past year. On average the participants in the printer section of our research, who had cause to use these services, rated their satisfaction at 7.7, over a point up on the 6.6 awarded last year

awarded to 9-pin and 24-pin models were in line with the overall averages awarded to Panasonic.

The reliability of Panasonic's laser printers was rated at 9.5, half a point above the overall average awarded to the vendor. In addition, the scores awarded for both attributes associated with product support were above the vendor's averages. For ease with which product support was obtained, laser end users awarded 8.1 points (vendor average 7.7), and for satisfaction with product support users awarded 8.1 points, against the vendor average of 7.4. Despite this improved performance brand loyalty among laser printer users was in line with the vendor's overall average at 88 per cent.

Panasonic would appear to have made a concerted effort to improve after-sales support and this has been rewarded with improved scores over the past three Service and Reliability Surveys. The market is changing, however, and an increasing emphasis is being placed on these services as a means of differentiating product. If Panasonic is to maintain its market share it must respond to these new conditions and continue efforts to improve the after-sales experience.

SHARP

FIVE POINT INDEX
7.3

RANK 15th

We only heard from 42 users of Sharp laser printers and, therefore, results are based on a relatively narrow band of user opinion and this should be remembered when interpreting results. In addition, Sharp printers tended to be slightly younger than average. End users reported their Sharp printers had been in use for 21.4 months, six months less than the overall average period of usage.

Sharp made its debut in the printer section of the Service and Reliability Survey last year, represented by just 30 users. Our five point index calculated a score of just 7.3 for Sharp. Only two other vendors achieved a lower score.

The overall reliability of Sharp printers was rated at 8.5, exactly half a point below the overall average. This result will be a disappointment for Sharp as the company performed well for this attribute in last year's survey, 9.2.

Equally disappointing to Sharp will be an apparent decline in brand loyalty. Last year, 86.7 per cent of users said they would buy another printer from Sharp and this year that proportion decreased to 81 per cent.

Despite their relative youth four out of 10 Sharp printers (40.5 per cent) had caused their users at least one problem, against an overall average of just 23.9 per cent. This high incidence of problems was reflected in a relatively high demand for product support. Nearly half the users of Sharp printers participating in our survey (45.2 per cent) said they had sought assistance compared with only just over a quarter of the overall printer sample (27.2 per cent).

Last year, 36.7 per cent of users reported experiencing at least one difficulty, while only 30 per cent had gone on to contact product support.

The ease with which product support was obtained was rated at 7.6, an insignificant 0.1 below the overall average. This score was consistent with the 7.5 awarded last year. Satisfaction with product support was rated at 6.4, a full point behind the overall average. Only one vendor achieved a weaker result for product support. The company achieved a score of 6.1 and ranked last but one in last year's survey.

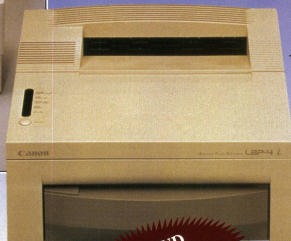
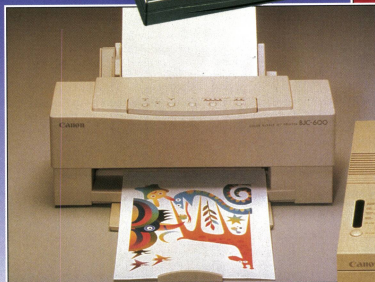
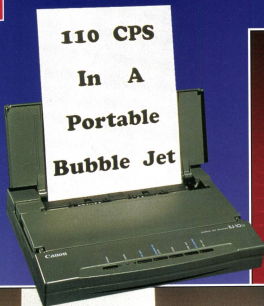
For repair service satisfaction Sharp's performance was even worse. End users awarded Sharp just six points for this attribute, 1.7 below average and the worst score awarded in this section of the survey.

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In addition, and despite their relative youth, Sharp printers had been out of action for an average of 2.4 days during the past year, 0.2 of a day above average.

With a small sample size Sharp could, perhaps, have been forgiven for apparently ignoring the results of last year's survey. With this set of results completely reaffirming our previous findings it would be a very foolish vendor who choose not to take action on this feedback from the installed base.

STAR

FIVE POINT INDEX 8.2

RANK EQUAL 4th

Star has been made famous by its low-end dot-matrix range of printers and the response to this year's Service and Reliability Survey suggest this range remains the main cash cow for this vendor. Virtually all of the 324 Star users participating in our research reported on dot-matrix printers and two thirds of these were 9-pin models.

In response to our first Service and Reliability Survey, Star users accounted for 11.9 per cent of the printer sample. Only Epson enjoyed a larger share of the installed base. By 1992, Star had moved into third place, and last year users accounted for 8.4 per cent of the sample, ranking this vendor fourth. This year, Star held on to its fourth place but users made up just 7.3 per cent of the sample. The move toward impact printers is apparently having a detrimental effect on the fortunes of this company.

Consistent with this finding end users reported their Star printers had been in use for an average of 38.1 months, over 10 months longer than average. The share of the installed base held by Star can be assumed to be significantly greater than the share of the market currently enjoyed by this vendor.

Star Micronics was established in Australia in 1986. The staff of more than 30 are located at offices in the major four state capitals. During the 1992/1993 financial year, turnover exceeded \$20 million.

Star claims to be the largest supplier of dot-matrix printers in Australia and to have a growing market share of the non-impact market. The company is well represented in the increasingly important high street market with all the major electrical retailers supplying part of the Star range of printers.

Star printers are supplied with a one-year parts and labour warranty with an option to extend this for a total of three years on dot-matrix printers. Free technical support is available from the vendor by telephone for the life of the printer. A fax-back service and free private bulletin board is in operation.

Overall, Star performed well in our survey, achieving a Five Point Index of 8.2, which was in line with the overall average recorded by all 4430 participants in our research. Due to the high standard set by the market leaders an average rating represents a very good result. In fact, only three vendors achieved a higher five point index score.

The overall reliability of Star printers included in our analysis was rated at 8.8, an insignificant 0.2 below the overall average. However, this critical score was slightly below that achieved in previous surveys, which all fell in the range 9.0 to 9.2.

Brand loyalty appears to be following a similar pattern with 85.2 per cent of this year's respondents saying they would buy another Star printer, down from around nine out of 10 users in our first two surveys. When respondents answered this question it is, however, possible that factors other than their satisfaction with the printer itself were considered.

Star user experiences were relatively problem free, with just over a fifth of users (21.6 per cent) reporting experiencing any difficulty with their printer since purchase. Overall, nearly one in four printer users (23.9 per cent) reported a problem. As

would be expected this low incidence of problems translated to a relatively low demand for product support, with one in four users (24.1 per cent) seeking assistance compared with the overall average of 27.2 per cent.

These results were consistent with last year's findings, but up slightly on the 1991 and 1992 results, perhaps reflecting the increasing average age of the Star printers included in our survey.

Making contact with product support was rated in line with the overall average recorded by the survey, at 7.7. This result will be a disappointment for Star which had been enjoying a positive trend in the results to this question. In 1991, users rated the ease with which they had obtained support at just seven points, the second lowest score awarded in the survey. By 1992, users awarded 7.7 and a similar increase was achieved last year, with users awarding 8.4.

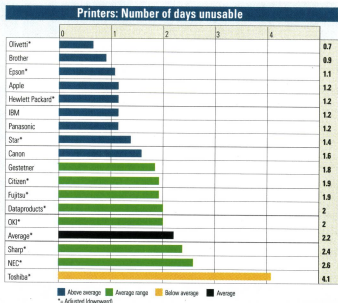
Satisfaction with product support was rated at 7.6, 0.2 above the overall average. This was a good result for Star, which has previously been rated at between 6.6 and 7.1.

For repair service satisfaction Star users awarded an outstanding 8.3, over half a point above average. Only two other vendors achieved a higher score for this attribute. In 1991, Star was awarded just 5.3 points for this same attribute—the second lowest score achieved. By 1992, that score increased to six and was followed, last year, by a score of 6.6.

Star printers had been out of action for an average of just 1.4 days during the past 12 months, nearly a day less than the overall average recorded by the survey.

We received sufficient response from Star users to look at the scores awarded to both major categories of dot-matrix printers in isolation. There were no significant differences in the scores awarded to 9-pin and 24-pin models compared with the vendor's average scores.

The biggest threat to Star is the market shift toward higher quality non-impact printers. The vendor would appear to have so far failed to make a significant impact on this market and is now in the unfortunate position of watching its market share erode as the product lifecycle of impact printers moves in to rapid decline. Long-term success depends on the vendor's ability to achieve significant sales in the impact market within the next 12 months.



Despite the improvement in repair service satisfaction end-users reported a slight increase in average printer down time compared with last year's result of 1.9 days.

Scores marked * have been adjusted downward to give a more accurate reflection of the majority of end-user experiences

TOSHIBA

FIVE
POINT
INDEX 7

RANK 17th

The last company to be listed in our alphabetical guide to the printer results section was, ironically, the worst performer in this year's Service and Reliability Survey. With an overall Five Point Index of just seven points, the company ranked dead last, 1.2 points behind the average. Company information is given in the PC section of this article. Toshiba withdrew from the local printer market towards the beginning of this year.

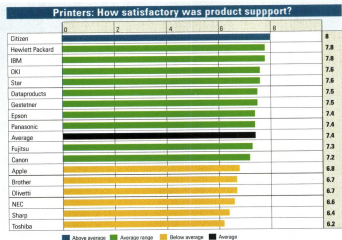
We heard from just 44 users of Toshiba printers and, therefore, results reflect a relatively narrow band of opinion and this should be remembered when interpreting results. In 1991, Toshiba printer users accounted for 2.9 per cent of the sample, but this proportion has been in decline ever since contributing just 0.9 per cent of this year's sample.

The majority of respondents reported on laser printers and, when looked at in isolation, it is unsurprising that the scores awarded by users of non-impact models did not differ substantially from the vendor's overall performance. The average age of the Toshiba printers included in our analysis was 32.4 months, five months older than average, suggesting the vendor is experiencing an even greater decline in market share.

The overall reliability of Toshiba printers was rated at 8.3, 0.7 below the overall average. Previous results have all been in the range from 7.9 to 8.2.

Just under two out of three Toshiba users (65.9 per cent) said they would buy another printer from the same vendor again, the lowest indicator of brand loyalty recorded by the survey. This result will be a disappointment to Toshiba as previous ratings have fallen in the range 78.9 per cent to 83.3 per cent. This year's score could have been affected by the fact Toshiba printers are no longer available.

Exactly half the Toshiba printer users participating in our research reported experiencing at least one difficulty with their printer since purchase. Toshiba users were more than twice as likely to have experienced a problem compared with the overall average. This high incidence of problems translated to a relatively high demand for product support. Almost exactly half the sample (47.7 per cent) said they had cause to seek assistance. Only the users of Dataproducts printers were more likely to have sought assistance. The high incidence



Overall satisfaction with printer product support was up half a point on last year. Only one vendor made it into the above average range, Citizen. The score awarded Citizen this year represents a significant turnaround from last year when the vendor earned a below average 6.2

of problems, and proportionately high demand for product support, are consistent with the findings of our previous surveys.

In contrast to our previous research, Toshiba did not perform well for any of the attributes associated with after-sales support. The good news was in the scores given for access to product support. In the past, scores awarded have been in the range 6.8

to 7.3. This year, end users awarded 7.5 points to express the ease with which they had obtained support. However, although this score was only 0.2 behind the overall average, only two vendors achieved lower scores.

Satisfaction with product support was rated at 6.2, the weakest score awarded in this year's survey. This result was on a par with that awarded in 1992, however the scores given in our other two surveys were significantly higher, 7.6 in 1991 and 7.3 in 1993.

Repair service satisfaction was rated at 6.6, the second lowest score recorded in the survey and more than a point behind the overall average.

This result was consistent with that attained in 1991 and a significant improvement on the 5.2 awarded when we last received sufficient response to rate Toshiba for this attribute.

Toshiba users reported their printers had been out of action for an average of 4.1 days during the last year, nearly two days longer than the overall average downtime.▲

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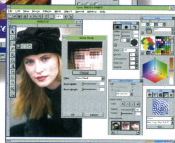
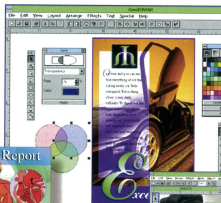
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APPLICATIONS DEVELOPMENT

Building a better App, SQL style

No time, no money, and a need for an application? Here are three places to begin.

By Gabrielle Gagnon

Teamwork allows average people to produce above-average results. This applies, of course, to applications development. Teams of developers must be able to collaborate effectively if they are going to produce applications that economically and quickly increase the scale of PC systems. In order to accomplish this task, many developers turn to client/server computing.

Not surprisingly, we've seen a recent boom in client/server development tools. The question we address here is to what degree these solutions meet the needs of developers — low cost, high performance, and a high level of collaboration. These tools have much in common; perhaps the most obvious is their use of SQL (structured query language). SQL, which has emerged as the industry standard for manipulating databases, is at the forefront. No large scale development tool would be complete without it.

Hence our review of three packages that purport to be large-scale SQL development tools: Gupta's SQL Windows, Version 4.1, Corporate Edition; KnowledgeWare's ObjectView, Version 3.0; and

Powersoft's PowerBuilder, Version 3.0. All three packages are professional development kits for building client applications that run under Windows. They provide access to a system via SQL, exploit rapid applications development techniques for creating working systems quickly, and provide resources for development teams.

To gauge how well these products meet the needs of enterprise developers, we examine them in five areas that can make or break a development project: rapid applications development, connectivity, querying and reporting, programming tools and, team development.

Rapid applications development

Evaluating each product's aptitude for rapid applications development allowed us to cut to the core of what these packages do best: let you develop applications quickly. Because they allow you to reuse prewritten, reliable code, they minimise development time.

Several techniques facilitate rapid applications development, such as automatic, code generation and visual programming, but one of the most important

is object-orientated programming (OOP). OOP utilises encapsulated modules of programming code and data called objects. Objects can be abstracted into object types, called classes, which can create new objects or be modified to create new subclasses.

Since subclasses inherit the characteristics of their parent classes, programmers need only supply code for what has changed. For example, if you already have a class for printing a document in a particular format and you want to print documents in a different format, all you have to do is create a subclass and change the format. The rest of the processing, such as initialising the printer and selecting fonts, is handled through inheritance.

Inheritance is one of the major advantages of OOP since it effectively eliminates redundant programming. OOP dramatically reduces development time by allowing programmers to reuse encapsulated objects in many applications and adapt them with a minimum of programming effort. And because OOP allows you to recycle reliable code, it facilitates building systems with fewer bugs, too.

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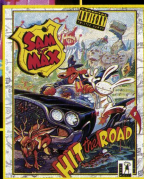
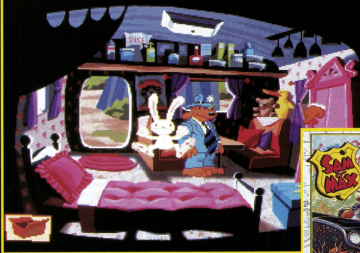


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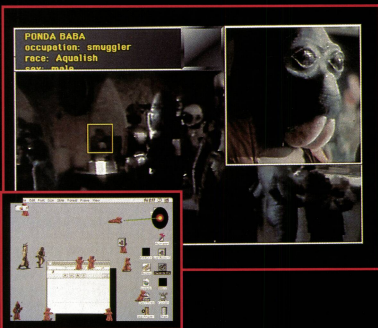


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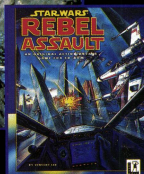
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OOP departs radically from traditional programming styles, however, and some of its more esoteric theories are difficult to grasp.

The ideal programming environment would call for a hybrid of OOP and traditional programming, and all three of these products provide such an environment. When we rated the packages in this roundup for rapid applications development, we evaluated the specific techniques they used to produce applications quickly, particularly the degree to which they implemented object-oriented programming. We also evaluated how those techniques affected productivity.

In our testing, we found PowerBuilder an outstanding tool for rapid applications development. Its slick suite of Painters — graphical tools that aid applications development — has been honed to afford a level of productivity and polish that is difficult to beat. This quasi-object-orientated package provides many of the advantages of OOP, such as encapsulation of objects, without any of the headaches. If you are already familiar with database concepts, you will be able to learn PowerBuilder quickly since all of its tools will have a familiar look and feel. PowerBuilder combines visual programming techniques with an intuitive point-and-click approach. It supplies all of the standard Windows objects and several custom objects that are so powerful that you can build a complete sophisticated application in less than an hour.

One of these custom objects, the Data Window, is a data-aware control of tremendous flexibility. Data Windows are associated with a data source, such as a query, and can change presentation styles such as tables or graphs without any coding. You can even change the presentation styles of individual columns within a data source. For example, you might choose to display a name and address in data entry fields and a person's gender in a radio button format. Because the Data Window is so powerful, it is the main vehicle for producing PowerBuilder reports.

Once your PowerBuilder application is finished, you don't need to throw it away and start over from scratch with the new one. Each application object and its extended attributes are automatically catalogued in a library data-base for easy access and reuse later.

SQL Windows is also no slouch when it comes to helping you produce applications. SQL Windows takes a more traditional approach than PowerBuilder in its



■ SQLWindows, Version 4.1, Corporate Edition

Version 4.1 of SQLWindows leads Version 3.0 of Powersoft's PowerBuilder by a hair's breadth. The difference lies primarily in Gupta's full-featured team development toolset, Team- Windows, and its no-nonsense approach to object-oriented programming.

Its ability to build class libraries and its support for multiple inheritance give SQLWindows' Application Language a distinct advantage over PowerBuilder's scripting language. Its version control and use of repositories for code and documentation as well as for objects make it a better all-around workgroup tool.

PowerBuilder isn't far behind though, with Version 3.0a, which was released during the writing of this article. Version 3.0a offers several enhancements, includ-

ing all back-end interfaces free of charge.

KnowledgeWare's ObjectView, Version 3.0, falls short in some categories but is unique in its broad back support, especially with non-relational and transaction-processing systems. ObjectView also offers good integration with other data modelling and version control systems.

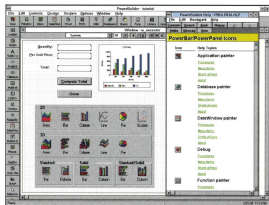
The competition between these three rivals remains fierce. One thing is certain: the real winners in this constant game of catch-up are the developers.

use of class libraries, yet it shields the developer from much of the complexity of OOP. Although it is not as simple to work with, SQLWindows features many of the same capabilities for producing sophisticated interfaces quickly, and it adds some programmer productivity aids to boot. The Outline Options window, for example,

your application and highlight any replaceable parameters.

ObjectView, on the other hand, is a relative newcomer to visual programming and object orientation. The visual ObjectView Editor, which paints screens, is new to this release and is still, to a large extent, parameter-driven. Its design does not enhance programmer productivity nearly as much as the design of PowerBuilder or SQLWindows. If you want to change the size of a window, you have to call up a dialog box and type in the coordinates instead of dragging the outline with a mouse.

In its favour, ObjectView is the only tool in this roundup that offers automatic code generation. Once you create the data model for your application and select the columns you wish to see, the Logical Data Modeller design tool will automatically generate source code for a default form based on the model. You can modify this source code as you like.



MATCHMAKER: ObjectView's Personal SQL identifies common fields to facilitate joining related tables

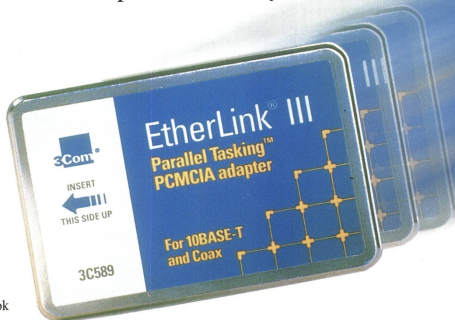
provides a context-sensitive dictionary of all the functions and constants available to the operation you're coding. When you double-click on a function, SQLWindows will insert the code for that function into

Connectivity

Front-end systems need a back-end data source to connect to, and in an enterprise that uses IBM mainframes, Unix database servers, and flat-file databases on a LAN, connectivity is vital. While the relational databases we reviewed all speak SQL,

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they don't all speak the same dialect, and large enterprises often have non-relational databases on mainframes that don't speak SQL at all. One solution to the SQL dialect problem is to use middleware as a translator. Middleware such as Microsoft's Open Database Connectivity (ODBC) and Information Builders' EDA/SQL acts as an intermediary between the client and the database server, providing a single application program interface (API) for front-end applications while handling most of the back-end communications transparently.

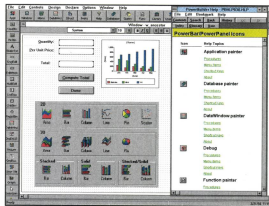
When evaluating connectivity, we checked the number and variety of back-ends a package can communicate with, including its support for middleware products, and we considered the robustness of its communications protocols.

All of these packages are compatible with numerous SQL databases, but ObjectView provides the broadest back-end support. In addition to supporting direct APIs, ObjectView supports numerous middleware products, including ODBC and Netware's TransAccess. TransAccess permits high-integrity interaction between ObjectView and a Customer Information management system transaction-processing systems on IBM mainframes — something that is lacking in the other packages reviewed here.

There was little difference between the other two in terms of connectivity. PowerBuilder had a slight edge over SQLWindows: unlike SQLWindows, it supports Microsoft's ODBC, which provides SQL access to several PC database and spreadsheet products. PowerBuilder's DataWindow also supports HLLAPI (High-Level-Language Application Program Interface), a mainframe terminal-emulation protocol, and SQLWindows does not. ObjectView supports both ODBC and HLLAPI.

Querying and reporting

Connectivity won't get you far if you can't select the data you need from the database you're using and present it in meaningful ways. So we evaluated the querying and reporting capabilities of each of these packages. We looked at how easy it was to formulate complex queries and how many kinds of reports and reporting styles were supported. Some types of reports can be problematic. For example, cross tabbed reports (which correlate data in a two-dimensional matrix) and two-pass reports (which require you to compute



APPS IN A SNAP: Window Painter, the elegant help system in PowerBuilder, facilitates rapid application development

large sums and other aggregate values before running the report) need a higher level of sophistication in a report writer than straight columnar reports.

Since users often want to customise their own ad hoc queries and reports, we gave bonus points to packages that included tools for this purpose.

All of the packages have visual tools for generating SQL queries and for

producing professional-looking business reports and charts, although PowerBuilder charges extra for them. (SQLWindows and ObjectView bundle their end user querying and reporting tools with their packages).

PowerBuilder offers optional rotatable 3-D graphs. Its versatile DataWindow object is particularly useful for executive information system reporting. SQLWindows' Quest is a design tool that can produce sophisticated queries and reports with a minimum of effort, and power users will like its ability to work with variables for picture objects.

In Version 3.0, ObjectView gained Personal SQL, an end-user query generator and report-writing tool. Within Personal SQL is a visual tool for selecting and joining data that is similar to the Logical Data Modeller but much simpler. Although ObjectView has some nice features, it is often inconsistent and departs from standard Windows conventions, which makes it more difficult to use. Personal SQL includes a graphical report writer, a great improvement from the text-oriented report writer supplied in ObjectView 2.1, but it still lags well be-

Suitability to task: Enterprise front-end development tools

These development toolkits are Windows-based SQL packages designed for building industrial-strength client applications. We assessed each product in five areas of concern to enterprise development.

RAPID DEVELOPMENT

The ability to expand prototypes into working systems is often crucial. We assessed how well these products enable rapid application development through the use of visual-programming tools, code generation, reusable modules, and code generation, reusable modules, and integration with data modelling tools. We also evaluated the quality of user interface—design tools and the breadth of standard interface components.

CONNECTIVITY

Since an enterprise's data is often distributed throughout the organisation, connectivity between a front end and a variety of back-end systems is essential. We scored each pack-

age on its ability to operate with other systems by looking at the number of protocols and back ends it supports and its ability to handle multiple APIs.

QUERYING AND REPORTING

Stored information must be retrieved and organised. We evaluated the extent of each package's SQL support and the range and quality of its analysis and report-writing tools.

PROGRAMMING TOOLS

To deliver bulletproof mission-critical systems, programmers need powerful tools that facilitate development. We looked for a strong, extensible programming language, an assortment of debugging and diagnostic tools, comprehensive help, and a developer-friendly environment.

TEAM DEVELOPMENT

Enterprise development often requires that developers work in tandem. We rated each package by the quality of its resources — especially repositories, version control, and security — and its ability to operate with other workgroup products.

Product name

SUITABILITY TO TASK

Rapid development	POOR
Connectivity	FAIR
Querying and reporting	GOOD
Programming tools	EXCELLENT
Team development	EXCELLENT

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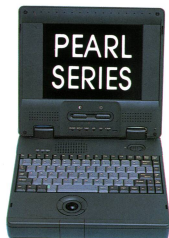
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hind SQLWindows and PowerBuilder's report-writing capabilities. While it can produce tabular as well as column reports with embedded graphics, you would have to write code to produce crosstabbed or two-pass reports. Crosstabbed reports correlate information in a two-dimensional matrix. Two-pass reports calculate totals (or other aggregates such as minimum values) and support them as inputs to the report. In other words, the aggregates have to be computed before the report is printed.

Programming tools

Developers of large-scale systems need a powerful, extensible programming language that can be adapted to meet specific business requirements, and they need robust debugging facilities to isolate and correct any problems.

They also need tools to make them more productive: a way to organise and track code efficiently and a developer-friendly environment that speeds up their tasks. Each of these packages includes a standard suite of programming tools such as a scripting language, editor, compiler, debugger, browsers, and an interactive testing program, along with some extra features that distinguish them from the other two.

SQLWindows' Outliner is a navigation tool that depicts an entire application in a collapsible tree structure. This versatile tool lets you display the tree in multiple windows, each with a different view of the application, enabling developers to navigate easily to any module in the system and to drill down to any level of detail they choose. With Version 3.0, ObjectView added a similar tool as well as a new impact analysis utility called Sherlock's View. Sherlock's View catalogues screen components and identifies all the screens that make use of a particular object. ObjectView's Logical Data Modeller presents a graphical representation of a database and the relationships between its tables including cardinality (one-to-one or one-to-many). You can join tables by dragging a foreign key to its related table and dropping it on

the related column. An arrow linking the two objects is automatically displayed. You can annotate these arrows with brief text clarifying the relationship. The Logical Data Modeller will also work with data models prepared by Knowledge Ware's Application Developers Workbench (ADW), a much more sophisticated analysis and modelling package.

PowerBuilder provides a similar graphical representation of data models in its Application Painter, and its Database Painter has a number of productivity aids to speed up data definition.

One of the most important programming tools included with any development package is the programming language. All of the products provide a proprietary event-driven scripting language that is extensible through function calls to dynamic link libraries, and except for ObjectView, these new releases support .VBX extensions too.

SQLWindows Application Language (SAL) is the only one that supports orientated classes. Since SQLWindows developers can form a subclass from any object — including standard Windows controls — in SAL, they don't need to write C++ programs, for example, from scratch to provide the same functionality. SAL's class implementation supports multiple inheritance, which gives an object the ability to derive characteristics from more than one parent class. PowerBuilder also provides a limited form of single inheritance for Windows objects (that is, a child window derives its variables and methods from a single parent window). ObjectView does not provide support for encapsulation or inheritance, but KnowledgeWare has said it will in the future.

Team development

Working on a large-scale development project almost always means working on a programming team, and a package built for large-scale development has to provide for that. At the least, a package needs a centralised repository of reusable objects and preferably of other system resources as well. It should allow developers quick access to shareable modules whenever they need them but also protect work in progress from unauthorised or mistaken entry. If the company maintains multiple versions of application modules, the package should support some form of version control — either its own or another system's — and if the company uses other workgroup packages, it should be able to work with them. Project management tools are also important, especially for large-scale projects. Team managers want to track modules through the stages of development, testing and acceptance

S U M M A R Y O F F E A T U R E S

Enterprise Front-End Development Tools

Products listed in alphabetical order ■ = YES □ = NO

	ObjectView	PowerBuilder	SQLWindows
Interface Design			
Visual programming tools	■	■	■
Automatic code generation	■	□	□
Comprehensive standard controls	■	■	■
Data-aware controls	■	■	■
User-definable controls	■	■	■
Back-End Host Support			
DBMS APIs	Informix, Quadsbase, Teradata	ALLBASE/SQL DB2, DB2/2, Informix, WAITCOM SQL, XDB	ALLBASE/SQL Cincron Sybase, DB2/2, Informix, Ingres, SQL/400*
Mainframe interfaces	CICS, HLLAPI, IMS/Info TransAccess Gateway	HLLAPI	None
Oracle	■	■	■*
SQLBase	□	■	■
SQL middleware	DB2/Integrator, EDA/SQL, MDI, ODBC, Q+E	DBCS/2, MDI, NetGateway, ODBC	EDA/SQL, MDI, Q+E
SQL Server/Sybase System 10	■ □	■ ■	■* ■*
Language Features			
Dynamic/static/embedded SQL support	■ ■ □	■ ■ ■	■ ■ ■
Standard-language DLL support	C, C++	C, C++, COBOL	C, C++, COBOL
Extensible classes/user-definable functions	□ ■	■ ■	■ ■
Query and Reporting Tools			
Query generator	■	■	■
Columns/table-based report writers	■ ■	■ ■	■ ■
Chart and graph generator	■	■	■
Programming tools			
Source editor/Browse/Inspector	■ ■ ■	■ ■ ■	■ ■ ■
Debugger/Source trace/Error traps	■ ■ □	■ ■ ■	■ ■ ■
Syntax checker	■	■	■
Interactive testing facility	■	■	■
Other	DBA, documentation	Code/object, DBA, object cross-reference, object search	Code assistant, collapsible code outliner, DBA
Workgroup support			
Version control	■	□	■
Shareable modules	■	■	■
Code/object libraries	■	■	■
Interfaces to other workgroup tools	ADW, PVCS	PVCS	None

*API drivers are available at extra cost.

AT A GLANCE**PowerBuilder 3.0a**

Distributor: PowerSoft Australia
Telephone: (03) 866 6014
Fax: (03) 820 2388
Price: \$7950

In short: A powerhouse of development tools, PowerBuilder is especially adept at producing polished, full-featured applications in virtually no time. Its suite of Painters provides a high level of productivity and polish. PowerBuilder also provides its users with a level of familiarity, adding to its ease of use. For large-scale development projects, it falls short in team development support, but its strengths far outweigh its weaknesses.

PowerBuilder 3.0**SUITABILITY TO TASK**

Rapid development	EXCELLENT
Connectivity	GOOD
Querying and reporting	EXCELLENT
Programming tools	EXCELLENT
Team development	FAIR

into production, and they want to control when a module is promoted to the next level.

SQLWindows and ObjectView are the strongest products in this category. SQLWindows Corporate Edition includes a

AT A GLANCE**ObjectView, Version 3.0 Developer edition**

Distributor: KnowledgeWare
Telephone: (02) 248 4005
Fax: (02) 248 5200
Price: \$4595

In short: Superb connectivity, integration with KnowledgeWare's data modeling and analysis packages, and comprehensive team-development tools make ObjectView a good choice for largescale development projects, but its lack of object orientation and inconsistencies in design keep it from being as useful as it could be.

ObjectView, Version 3.0 Developer edition**SUITABILITY TO TASK**

Rapid development	FAIR
Connectivity	EXCELLENT
Querying and reporting	GOOD
Programming tools	GOOD
Team development	EXCELLENT

package called Team Windows, a set of tools with extensive features for managing and facilitating large-scale development projects. Team Windows has comprehensive repositories for source code, documentation, and other application resources, as well as for standard data dictionaries and object libraries. These facilities are shareable and can be checked in or out by authorised users. User profiles determine access, and security levels range from project administrators and project managers to developers and testers.

Team Windows also includes version control and promotion-level security. Each module can be assigned a promotion level with conditions attached to its promotion to the next level. For example, a sign-off option ensures that test libraries are formally approved before they can be moved into production.

Another strong feature of Team Windows is the inclusion of template libraries. Templates are screen definitions that can be used to generate other screen definitions. Since templates are screen classes, any changes to the original template immediately ripple down to derived screens through inheritance. This feature drastically reduces system maintenance and allows developers to give a consistent look and feel.

ObjectView also has strong team development resources. Its Workgroup Library includes shareable object and file libraries, which can be divided into application domains or sub-systems. This allows teams to share resources within a workgroup as well as access centralised dictionaries. The Workgroup Library also provides promotion-level security and flexible version control. Its versioning hierarchy allows for multiple releases as well as multiple versions within a release. ObjectView also provides support for Intersolv's popular PVCS version control system.

Except for PVCS support and centralised libraries for shareable objects, PowerBuilder does not provide much in the way of team development tools. The Version 3.0a upgrade, released after our tests were completed, adds an Application Framework library, which should enhance its workgroup offerings.

Strong and good-looking, too

All three packages have the brains and the brawn to deliver smart-looking, robust applications. The one you choose may largely be a matter of taste. If producing systems quickly is your main concern, you can't go

AT A GLANCE**SQL Windows, Version 4.1e Corporate edition**

Distributor: Gupta
Telephone: (02) 948 6408
Fax: (02) 948 6553
Price: \$5770

In short: SQLWindows' support for class libraries and multiple inheritance gives it a distinctly object-orientated flavour.

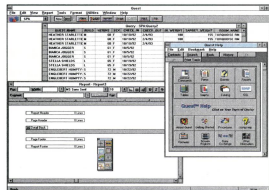
Particularly strong in programmer productivity and workgroup tools.

SQLWindows is also an excellent choice for rapid applications development and end user

reporting. The package provides several programming, including its own scripting language, similar to C++, and Outline Options window.

SQL Windows, Version 4.1 Corporate edition**SUITABILITY TO TASK**

Rapid development	EXCELLENT
Connectivity	GOOD
Querying and reporting	EXCELLENT
Programming tools	EXCELLENT
Team development	EXCELLENT



Intuitive: QL Windows' Quest is a push-button utility for producing sophisticated reports without coding

wrong with PowerBuilder or SQLWindows. For sheer ease-of-use and versatility, PowerBuilder is hard to beat. Its suite of Painters can help you create a masterpiece in a matter of hours. SQLWindows offers the extensibility of object-oriented classes libraries and a cadre of programming tools that serve the developer on every scale — from the single-programmer prototype to the hundred-member down-sizing team. ObjectView too has plentiful resources for development teams and levels of connectivity that are scarcely dreamt of in the DOS world. Whatever your corporate development challenges are, these packages are ready to take them on. ▲

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486SX-25/-33 CPU	44256 DRAM



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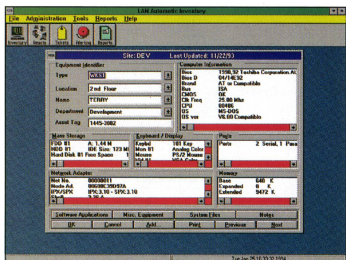
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NETWORK MANAGEMENT

McAFEE'S BRIGHTWORKS



Brightworks' hardware and software inventory modules collect detailed information from any or all PCs on a network.

McAfee Associates' Brightworks addresses the basic need of every network administrator: to keep track of what's running on the network. Brightworks, originally sold as Fusion by Brightwork Development before that company was bought by McAfee, targets a market currently addressed by two categories of products: separate utilities that handle metering, inventory, and distribution and packages that combine these features in an integrated utility (like The Norton Administrator for Networks and Saber LAN Workstation with Saber Enterprise Applications Manager, or SEAM).

By combining hardware and software inventory with software metering and distribution in one package, Brightworks offers a level of convenience not matched by the individual utilities. Compared with other integrated packages, however, Brightworks faces much stiffer competition from well-established products such as Symantec's The Norton Administrator and Saber's LAN Workstation with SEAM.

Brightworks' hardware-inventory module collects detailed information from any or all PCs or Macs on a network and stores the data in a common database format that can be used to generate reports within Brightworks or exported to other applications such as dBase, FileMaker Pro, and Microsoft Excel.

The software inventory module scans

each client's hard disk and provides a detailed report on all applications. Brightworks' database of product specifications allows it to recognise 2000 software applications. You can also add software products to customise the list.

Brightworks' software metering allows network administrators to monitor the number of software licences that are running on the network. This data can be used to indicate trends; administrators can plan software purchases based on average usage. Brightworks also provides an impressive reporting feature for the metering data. But metering can be performed only on applications that are launched from the server; Brightworks does not meter applications that run on network clients.

The software distribution feature is useful because it can install software from a central console to clients located anywhere on your network, and update client system files such as AUTOEXEC.BAT or CONFIG.SYS as necessary. Brightworks' software distribution provides a powerful filtering scheme through which you can specify the criteria a client must meet before certain software is installed. For example, you could set a filter to install CAD software only on PCs with at least a 486 CPU and 16M RAM. This feature is also ideal for updating client shell drivers on any PC on the network.

Other features provided by Brightworks include notification, which integrates with Lotus' cc:Mail and lets you either launch cc:Mail or send a message to alert users of impending software updates. It also supports a paging feature, through which it can send the administrator notification of specific network events, such as failed remote installation, via an alphanumeric or digital pager.

Overall, Brightworks provides a solid combination of desktop management features.

Ryan Tabibian

*Distributor: Doctor Disk
Phone: (02) 281 2099
\$3000 for 50-node pack; \$4000 approx for a 75-node version. Call company for price list.*

In short: Brightworks provides a good range of features, and if priced right locally, it should do well against its more established competitors.

SOFTWARE

Intel steps up network management and analysis

Intel promises to increase the level of control of its LANDesk management products for LAN and enterprise-wide environments. The new versions of LANDesk Traffic Analyst and the new LANDesk OpenView for Windows join Intel's LANDesk Virus Protect to step up the products' security, troubleshooting, and performance analysis.

LANDesk Virus Protect protects NetWare LANs from known and unknown viruses. Version 2.1 runs on an NLM on Novell's NetWare management System, providing a single point of control.

Version 2.0 of LANDesk Traffic Analyst is now available for Windows users as well as DOS users. The current version of this software provides packet and monitoring capabilities for both Ethernet and Token-Ring NetWare LANs.

In a collaboration with HP, Intel is now offering LANDesk OpenView for Windows. It integrates Intel's LANDesk Manager, Version 1.51, and LANDesk SNMP Gateway, Version 1.5, with HP OpenView for Windows, Version 7.1. LANDesk Virus Protect, Version 2.1, costs \$799 and LANDesk Traffic Analysis, Version 2.0, costs \$1275. LANDesk OpenView for Windows costs \$3340. The products are available from Com Tech Communications on (02) 317 3088, Tech Pacific on (02) 697 8666, and Merisel Australia on (02) 882 8888.

HARDWARE

Peer to server

Artisoft's new CorStream, the result of a technology alliance between Artisoft and Novell, is the company's latest networking solution. The CorStream server offers 32-bit NetWare performance with the functionality of peer-to-peer networking by combining the high performance of the 32-bit LANtastic network NetWare Loadable Module (NLM) with the Runtime version of Novell's NetWare 4.01 operating system.

The new CorStream server, which won US *BYTE Magazine's* Comdex Spring Best Networking Award, is available now. CorStream Server Only packages are available in versions for five users through to 100 users, from \$1700. Packages the CorStream Server with LANtastic 6.0, ranges from five user ver-

sions to 100 user version and starts at \$2050. For more details, contact Artisoft Australia on (02) 880 2688 or (008) 808 432. Artisoft products are distributed by Merisel Australia on (02) 882 8888 and Digital Solutions on (07) 883 1851.

PCMCIA network adaptors

HyperTec has released new PCMCIA adaptors for Token-Ring and Ethernet networks that the company says provide notebook and other portable PC users with high-speed access to networks.

The \$855 HyperRing adaptor for Token-Ring networks allows for either 4 or 16Mbps operation and supports UTP and STP cabling. The HyperEnet adaptor for Ethernet networks costs \$264 and is Novell NE2000-compatible, and supports 10BaseT and coaxial connections. Contact (02) 805 0111.▲

POWERLan from Bellfern takes the confusion out of networking computers. PC Magazine's editor agrees.

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The open systems that you really need have a smattering of proprietary technology.

By Nick Lippis

Don't get locked in the open

The folks from Digital, in no uncertain terms, repeatedly emphasise the company's push towards open systems. "What we do," said the spokesperson, "is geared towards standard systems. We are open."

Is this Digital? The same Digital that brought us the VAX? That helped define the word *proprietary*? When Digital talks about its open system, it's time to pay attention to change.

But I'm not sure that this battle cry for openness signifies a change for the better. Don't get me wrong: I'm as much of an advocate of open systems as anyone else, but there's open and then there's *open*. Let me explain.

There are two schools of thought concerning open systems: one teaches that open networks are based on standards. This school's faculty is out to lunch. Its lessons leave you ill-prepared to cope with the difficult tasks of running even a work-group network.

The reason is simple: open standards are driven first by competitive pressures and only second by the needs of network managers. Open standards are nothing more than attacking the market leader. IBM, HP, and Apple are doing this to Microsoft with their Taligent effort. Proteon, Wellfleet, 3Com, and a horde of others attempted to knock Cisco's interior Gateway Routing Protocol with their open shortest path first initiative.

And that's why you need to look at the second school, which sprinkles a bit of proprietary technology in with the open systems approach. The essence of this approach is that you have choices: you can select and connect both computer systems and network components independently. But remember: the APIs and

hardware interfaces may be open, but behind them is proprietary technology. By this definition, even proprietary technologies such as Windows and DOS are open.

Vendors who invest in an open strategy of choice enjoy high growth. By never investing in proprietary networking protocols like IBM did with SNA and Digital did with DECnet, and by making Unix one of its most important operating systems, HP has seen 30 per cent growth while other minicomputer makers have run for their handkerchiefs. Novell, by offering NLMs as an integral part of NetWare, has created an industry around itself. Clearly, Microsoft and Intel are the kings of this open approach.

Router industry leaders such as Cisco, Wellfleet, 3Com and Proteon take the second approach. By providing multiple protocols such as TCP/IP, IPX, and AppleTalk on one hardware platform — instead of only supplying their own protocol or even a single standard protocol — they offer network managers choice and options. The hub vendors have taken this approach as well, offering freedom and choice for physical and logical networking. If a vendor doesn't offer choice, it will champion a standard. More often than not, though, this standard will come with proprietary extensions that will make it less standard. The other trap is a vendor offering both a standard and its own proprietary approach hidden under the thin veil of choice. We see this all the time: Cisco offers both protocols, IGRP and OSPF and IBM offers AnyNet — multiprotocol support on different operating systems like OS/2. (Thus IBM yields access to mainframe applications via such protocols as SNA and APPN as well as IPX and TCP/IP, and now

Novell with access to NetWare via IPX and TCP/IP).

The pitch from vendors like Cisco and IBM goes like this: "We support and provide both open standards and our own proprietary or legacy technology to help you move from where you are to the open-system nirvana of tomorrow." But tomorrow never comes. Invariably, the proprietary technology is where the features, functions, performance, and margins are. It's no wonder that Cisco's IGRP will operate better than OSPF or that file transfers will be faster over DECnet than over TCP/IP. Over time, the facade of open systems will give way to account control and vendor lock-in.

So which camp does Digital fall into? Not sure. It may fall somewhere squarely in the middle.

The best thing that you can do is define an enterprise network architecture. An architecture provides a blueprint and guides investment. A user-driven network architecture will obtain convergence on key interfaces of the four primary enterprise network domains: physical, logical, management, and distributed services. Interfaces, above all, are stability points within networks. Some of these interfaces may be open standards, others may be proprietary. The key point is that the network manager and users choose with their eyes wide open.

The boxes may change, but if you pick the right interfaces to comprise a network, its structure will remain constant during the change. By engaging in the process of network architecture definition, you will make interface choices openly, reducing the chances of being locked into a vendor's open network, even if that network is from Digital. ▲

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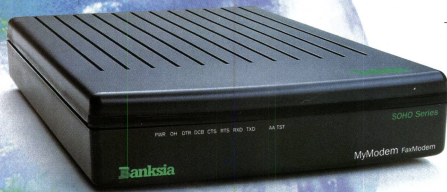
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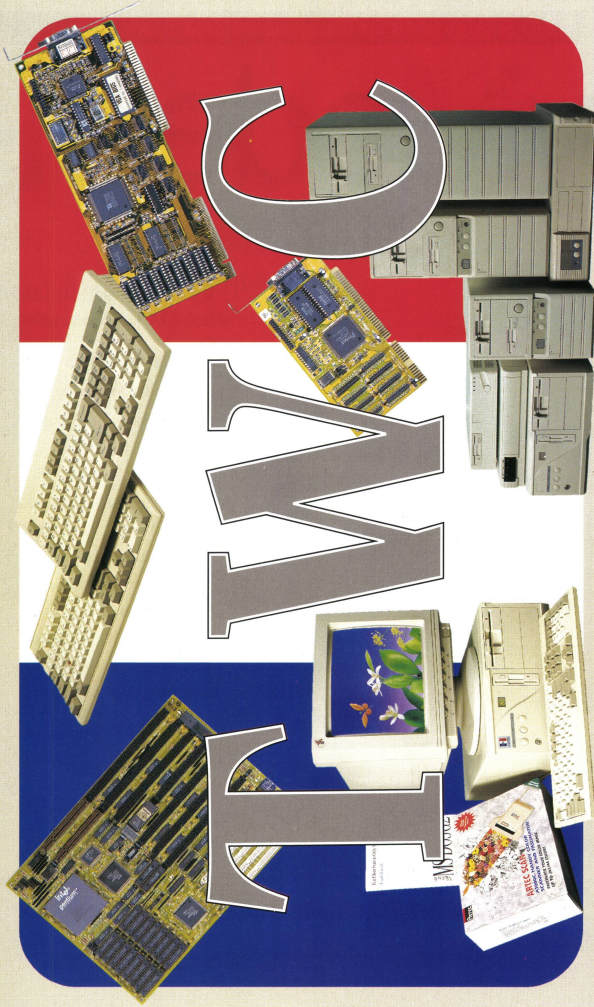
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Disk-At-A-Glance gives you detailed information of space used on your hard drive in a way that's easy to understand — even for the novice.

BY RICHARD GOULSTONE AND STEVE LEONARD

What a DaaG

No, not the bits hanging from a sheep, but Disk-At-A-Glance (DaaG), a new DOS and Windows utility to show you the amount of space each directory is using on your hard drive, and how much space you have remaining. It does this using colourful graphs and easy to read directory trees, as opposed to doing a DIR in DOS and being confronted with a 10 or 11 digit number at the bottom of the screen, which you then have to convert into Kilobytes or Megabytes.

Its main features are:

- Tree map with directory sizes and sub-directory counts and sizes
- Pie charts depicting 16 largest directories
- Analogue gauges showing free space for all drive letters
- Bar graphs showing relative sizes of all directories
- Ability to PRINT hard copy of tree map, gauges, and pie charts

Disk-At-A-Glance was written in Turbo Pascal using Blaise Power Tools, by Steve Leonard. You can obtain a Shareware copy of DaaG by mail. For details, see the sidebar 'How to obtain a copy of DaaG'.

Setting up DaaG

After installation to your hard drive you must generate the directory trees by choos-



Fig 1: This is the main screen to DaaG, which has all the option toolbars along the top of the screen, leaving the rest blank for the display of data.

ing the generate option from the toolbar (a tree with a lightning bolt striking it, see Figure 1). This will create a directory named DAAAG to hold the tree map file(s). This tree map file is named DAGW.TRX, where x is the drive letter, tree map files for all drive letters are now stored in the DAAAG directory on the same drive, the default for this is drive 'C'. This allows DaaG to be used to report on CD-ROM drives.

To use a different drive letter to store this information, enter the drive letter as a command line argument TWICE. For example, to store all the tree map files on drive D, have the command line say 'DAGW.EXE D D'.

Options

DaaG has four main functions, as well as

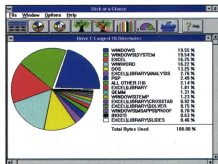


Fig 2: Pie chart showing the largest 16 directories.

on-line Help and the ability to print all the output (except for the pie charts).

Pie Chart

This has two options, either displaying the largest 16 directories as a pie chart (see Figure 2), or else a pie chart where only the first level directories are shown. This means that only the directories that are directly under the root directory are shown. The file sizes for each include all the sub-directories under the first level directory.

Although it displays 16 fields, the program really only graphs 15 directories for both options, the 16th field is used to display all the 'other' directories as one group. In either case, each slice represents which per cent of the 'used disk space' (not the total disk space) is taken up by a directory. This is required so that the Pie Chart percentages will always add up (approximately, due to rounding) to 100 per cent.

Tree Map

This shows the number of bytes used by each directory (see Figure 3), and a cumulative size for those directories that have sub-directories. The cumulative size

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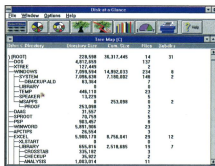


Fig 3: Display of the Tree Map.

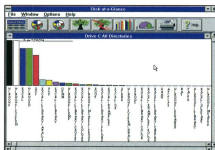


Fig 4: The bar graph display shows all directories in a graphic form, in which case the graph could be very large.

The last display option shows the amount of total disk space used and free in the form of a car's fuel gauge

column for any directory refers to the number of bytes in all the child directories of THAT directory, plus the number of bytes in the directory itself. If the directory has no sub-directories, then the cumulative value is left blank (since it is the same as the directory).

The 'Subdirs' column gives a count of how many directories are in this branch, including itself. However, if there are no sub-directories, (meaning the count is 1) the number is not displayed. By looking at the value for the root directory, you can immediately see how many directories are on the disk.

Whenever you add or delete directories, you must up-date DaaG by selecting the generate tree option again (refer 'Setting up DaaG'). One of the routines that carries out

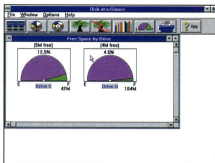


Fig 5: Is your drive running on empty? The Free Space option will let you know at a glance.

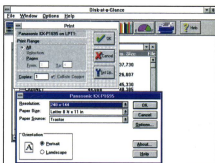


Fig 6: Among other things, the print option allows you to customise your printer.

the generate 'Tree Map' can be seen in Figure 8.

Three routines are shown in Figures 9, 10 and 11 that are used (but not exclusively) by the Tree Map routine.

Bar Graph

This option displays ALL directories (as does the Tree Map option) in a bar graph style, from largest to smallest (see Figure 4). The bar graph scale changes depending on which directory your scrolling window starts at. The scale is printed at the top of the window. If you scroll one unit left or right, the scale may become inaccurate — to correct this simply scroll the window up and down, or scroll a page at a time. The bar graph window is designed to show relative directory sizes;

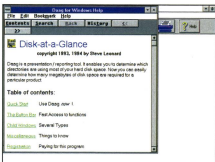


Fig 7: The on-line help is all you would expect from a Windows utility, with the usual search options.

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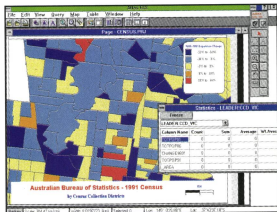
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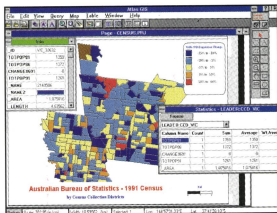
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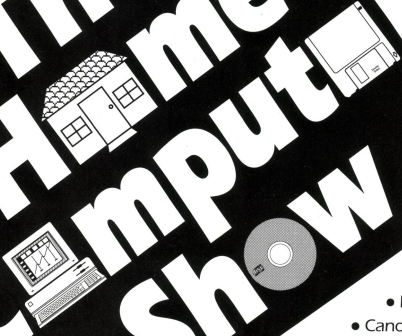
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for the exact sizes, refer to the Tree Map window.

Free Space

The last display option is the free space function (see Fig. 5). This displays the total disk space used and free in the form of a car's fuel gauge and is represented in megabytes and a percentage.

Print

DaaG's print facility (see Fig. 6) allows you to keep a hard copy of your drive's directories on hand. This is invaluable for keeping track of paths for different files if you do a lot of word processing or programming, but can never remember what directory you stored a certain file in!

Inside workings

There is a file size discrepancy on the analogue gauge displays (due to no fault of the programmer!). These analogue gauges show the total capacity of each drive letter, and the amount of free space on each. If you subtract the free space from the total size, you can see how much space you are using.

However, this number does not match

By doing a 'tag sort' on records containing just the directory size and the record number, a little over 5000 records could fit in the 64k area.

Quick reference guide

DISK-AT-A-GLANCE

- Purpose:** Disk-At-A-Glance is an easy to use Windows or DOS utility to let you see how your hard disk space is being used, by what directories and how much free space you have.
- Setup:** Copy the files to a directory on your hard drive, in the Windows program manager select 'NEW' under the 'FILES' menu, then type in the drive and path name of where you copied the files.
- Remarks:** Make sure the first thing you do when you run the program is to generate a 'TreeMap', this will take up approximately 35K per 150M of hard disk space. You should re-generate the 'Tree Map' everytime you add or delete a directory. DaaG will work on however many hard drives you have installed, including a CD-ROM drive.

the 'cumulative size' column for the root directory in the Tree Map window. This is because the cumulative column is the sum of the number of bytes in each file on your disk. It does not include the bytes used for a directory itself. DOS allocates file space in clusters (usually 2048 or 4096 bytes to a cluster). So even a 20 byte batch file, for example, will actually use 2048 or 4096 bytes (depending on cluster size).

DaaG Logic

Basically, DaaG writes one record to its tree file (DAG32.TRE) for each directory on the disk. Each time you hit PgDn, it adds 17 to a pointer and seeks that record, and reads and displays the next 17 records. The line drawing characters are stored for each directory in the record.

The pie chart logic is complicated because, in order to display the 'Top16' directories, it has to sort all the directory records by size, and then collectively ac-

cumulate all directories smaller than the top 15 into a single imaginary slice called 'All Other'. But as 'All Other' grows, it floats up within the 'Top 16', and on a large drive may become the largest slice. The whole sort manipulation is done in memory, but is limited to a 64k data structure. By doing a 'tag sort' on records containing just the directory size and the record number, a little over 5000 records could be fit in the 64k area. If not for the pie chart and bar graphs, there would be no limit to the number of directories it could handle.

There were some other tricky problems to solve in writing DaaG, with it having over 4250 lines of code. The 'heart' of DaaG is a recursive function (see Figure 8) that passes through all directories on a given disk. This is what is executed when you choose the generate tree option, and you can see where it prints out the directory tree as it is being generated. Note that the algorithm that plugs in the ASCII line drawing charac-

Read Dir

```
function readdir(s1:string) : byte;
var
  i : byte;
  sr : searchrec;
  prefix : string;
begin
  findfirst(s1, anyfile, sr);
  while doserror 18 do
    begin
      if (sr.name '..') and (sr.name '.')
        and ( ((sr.attr = 16) and (sr.attr 23))
          or ((sr.attr = 48) and (sr.attr 55)) )
      then
        begin
          trec.dos_name :=
            copy(s1,1,length(s1)-3)+sr.name;
          trec.attr := char(sr.attr);
          prefix := '';
          if num_backslash(trec.dos_name) 1 then
```

Partial Listing

```
for i := 1 to
  num_backslash(trec.dos_name)-1 do
  prefix := prefix + '3';
  prefix := prefix + 'CD';
  trec.name :=
    prefix+last_chunk_of_dos_name(trec.dos_name);
  trec.size :=
    size_of_directory(trec.dos_name);
  writeln(' ',trec.name);
  write(inf,trec);
  (RECURSION)
  dummy :=
    readdir(copy(s1,1,length(s1)-3)+sr.name+'\*.');
  end;
  findnext(sr);
  end;
  readir := 0;
  end;
```

Fig 8: One of the main routines of DaaG, used to search through every directory when generate 'Tree Map' is selected.

Size of Directory Partial Listing

```
function size_of_directory
(s1:string) : longint;
var
  tot : longint;
  sr : searchrec;
begin
  tot := 0;
  findfirst(s1+'*.*',anyfile,
    sr);
  while (doserror = 18) do
  begin
    tot := tot + sr.size;
    findnext(sr);
  end;
  size_of_directory := tot;
end;
```

Fig 9: This routine returns the total number of bytes within any given directory

ters is not perfect; a later pass is required to change some of the connecting lines to the right angle character.

Other versions

The version discussed was for Windows 3.1, there is also a DOS version available from the author (for US\$18 which includes postage and packing) which has some extra features to those mentioned here, namely

- It can quickly find or change to direc-

tory by typing part of directory name
■ It also gives pie charts at the 'branch' level

- It can 'drill down' on a particular directory to get details of file sizes by extension, then list all files within that extension
- It can 'launch' programs without taking up any extra memory

A major feature that the Windows version doesn't have that the DOS version does is a standalone program called

Last Chunk of DOS Name Partial Listing

```
function
last_chunk_of_dos_name(s1:
string) : string;
var
  i : byte;
  tempstr : string;
begin
  tempstr := '';
  i := length(s1);
  repeat
    insert(s1[i],tempstr,1);
    dec(i);
  until s1[i] = '\';
  last_chunk_of_dos_name
:= tempstr;
end;
```

Fig 10: Returns just the sub directory name from a fully qualified directory name. For example, from 'C:\BP\EXAMPLES\CHES\$' it would return 'CHES\$'

A major feature that the Windows version doesn't have that the DOS version does is a standalone program called 'Delta-DaaG', which tracks file changes over time. This program takes a 'snapshot' of your disk.

First Level Dir Partial Listing

```
function
first_level_dir(i:longint) :
boolean;
var
  s1 : string;
  temp_rec : tree_rec;
begin
  seek(inf,i);
  read(inf,temp_rec);
  if
    (length(temp_rec.dos_name) = 3)
  or
    (count_str('\',temp_rec.dos_name)
    = 1) then
    first_level_dir := true
  else
    first_level_dir := false;
end;
```

Fig 11: This will return TRUE if the corresponding tree record is a 'first level' directory, that is, its parent directory is the root directory

'Delta-DaaG', which tracks file changes over time. This program takes a 'snapshot' of your disk. You periodically take additional snapshots, and Delta-DaaG shows all file additions, deletions, and changes that occurred between snapshots. It also displays a histogram bar graph of files by date stamp for the past 240 months. You may find there's a bunch of files dated March 1983 on your drive. A single mouse click shows what these files are.

Steve Leonard's address is: 12 Green Springs Lane Madison, AL 35758 USA or on Compuserve at 73557,203. The program can also be registered on Compuserve (go SWREG, id # 879).

DaaG is one of those utilities that you will keep on a corner of your Windows desktop and refer to again and again, wondering how you ever got by without it. This is a tribute to its ease of use, compact programming and functionality.▲

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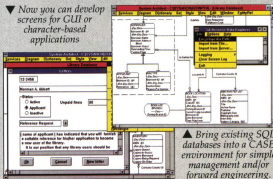
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OPERATING ENVIRONMENTS

TIP OF THE MONTH: ANSI colour

Most people know that they can write batch programs or menus to make using MS-DOS easy and user friendly, but few know how easy it is to include colour in their programs. All that is required is to load ANSI.SYS in your CONFIG.SYS on boot up then 'echo' ANSI escape sequences in your batch program.

An ANSI escape sequences a string of characters that start with the 'ESC' character and the left bracket '[' then followed by parameters separated by a semi-colon ';'. The 'ESC' character is a special character that can be created by pressing CTRL+P and then ESC in MS-DOS Editor, or if you use Microsoft Word, by pressing ALT+27 (the ESC character looks like a small arrow).

When you use ANSI escape sequences in a batch program you 'echo' them, that is, you place the command ECHO at the beginning of the line (the '@' symbol will be used to represent the ESC character).

```
ECHO @[41;30m
```

This will set your screen to red background with black foreground

```
ECHO @[0m
```

This will return the screen to the default colours.

```
ECHO @[33;41;1;5mWARNING
```

This will display WARNING in bold yellow blinking on a red background. Listed below (see Fig 1) are some of the parameters that can be used to change the screen attributes, to find out more type HELP ANSI.SYS at the C: prompt.

Now to put this knowledge to good use I have included a small batch menu using ANSI escape sequences (see Fig 3) to give it colour (this batch program uses the MS-DOS 6 Choice command so if you don't have MS-DOS 6.x it won't work, sorry).

Trevor Johnson
Wagga Wagga, NSW



ANSI (American National Standards Institute) is an alternate display and console driver that was first released with MS-DOS version 2.0 way back in 1983. To enable you to use such features as Trevor has outlined in your own batch files, you must first add the following line to your CONFIG.SYS

```
DEVICE=C:\DOS\ANSI.SYS
```

ANSI.SYS is usually stored in your DOS directory on the



Fig 2: See how colourful DOS can be by using ANSI codes in your batch files. This is the output of Trevor Johnson's menu program

C drive, but if it isn't, you should substitute your correct path name for the one used above.

Once ANSI.SYS is installed, it will replace the standard DOS console driver, allowing you to use not only colours in your batch file but other features such as changing screen mode and cursor position and also redefining the keyboard.

Text attributes

- | | |
|--------------------------------|----------------|
| 0 All attributes off | 1 Bold on |
| 4 Underscore (monochrome only) | 5 Blink on |
| 7 Reverse video on | 8 Concealed on |

Foreground colours

- | | |
|----------|------------|
| 30 Black | 31 Red |
| 32 Green | 33 Yellow |
| 34 Blue | 35 Magenta |
| 36 Cyan | 37 White |

Background colours

- | | |
|----------|------------|
| 40 Black | 41 Red |
| 42 Green | 43 Yellow |
| 44 Blue | 45 Magenta |
| 46 Cyan | 47 White |

Fig 1: Screen attribute parameters

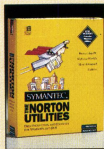
Tip of the month

Prizewinner

Congratulations to Trevor Johnson of Wagga Wagga NSW for his handy ANSI tip on how to put colour in your MS-DOS programs.

We'll be contacting him to arrange delivery of a copy of Symantec's Norton Utilities, plus a cheque for \$50.

Send in your technical tips for a chance to be our next winner.

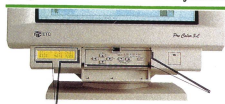


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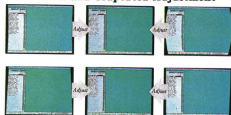


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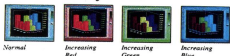
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ANSI batch menu

1 of 1

```

:TOP
ECHO OFF
CLS
ECHO.
ECHO @[0;1;33m-----### COLOUR MENU ###-----
ECHO.
ECHO @[0;1;32ma .... @[0;1;34mWindows
ECHO @[0;1;32mb .... @[0;1;34mBoxer
ECHO @[0;1;32mc .... @[0;1;34mDoom
ECHO @[0;1;32me .... @[0;1;34mExit ECHO.
ECHO @[0;41;1;37;5mPlease choose a letter @[0m
CHOICE /C:ABCEF /N /T:F,20 @[21;1H @[0m
IF ERRORLEVEL 5 GOTO TOP
IF ERRORLEVEL 4 GOTO EXIT
IF ERRORLEVEL 3 GOTO DOOM
IF ERRORLEVEL 2 GOTO BOX
IF ERRORLEVEL 1 GOTO WIN
:WIN
CD \WINDOWS
CALL WIN
GOTO TOP
:BOX
CD \BOXER
CALL B
GOTO TOP
:DOOM
CD \DOOM
CALL DOOM
GOTO TOP
:EXIT

```

Fig 3: Batch menu using ANSI escape sequences

Note, however, that batch files written for ANSI will not work on PC's that don't have it installed.

Richard Goulstone

Incompatibility

TIP: I want to advise readers of incompatibility problems between Microsoft Windows for Workgroups v3.11 and Norton Desktop for Windows (regardless of version). NDW cannot cope with the 32-bit file and disk access feature of WFW. NDW normally intercepts Windows and DOS to enable the Diskdoctor and other NDW features to run. However, WFW by-passes BIOS to directly address the hard disk/s causing problems for NDW.

It appears that we have a choice: 32-bit

access or NDW. The Symantec helpline people said that they were aware of the incompatibility (they only use 16-bit access, I was told) and someone is working on it. Not even NDW v3 (just released) can cope with 32-bit. However, no one told either Microsoft or NDW's registered users.

Why bother registering software if Symantec does not bother to inform its customers of issues as crucial as this? We will not be paying out for any NDW v3x upgrades until the product can cope with 32-bit.

**Rod Olsen
Sydney**



Thanks for the tip Rod, it should be helpful to users having similar problems.

In defence of the businesses involved, it is very difficult for individual companies to test each other's systems for compatibility for every eventuality. The best we can hope for is that they take notice of the problems when they arise and promptly fix these in later versions, patches or upgrades.

It would also help, however, if developers didn't do things like bypassing the BIOS!

Richard Goulstone

WORD PROCESSING

Errors

I have written the macros Pix and NewFontSamples from this column's APC February issue (page 179), however I have not been able to get them to run. Is there a problem with the originals or is it me? I keep getting a syntax error, can you please advise?

**Ron Wright
Mitcham**



Unfortunately, due to a printing error, a right bracket was left off the end of line two of the PixSamples macro. The correct line should read:

```
PixPath$ = InputBox$('Type
in the path to search:')
```

As for the second error you mention, there doesn't seem to be anything wrong with the listing you sent us, so all I can suggest is to re-enter the macro exactly as listed in the magazine.

This will at least fix one of the errors you were getting.

Richard Goulstone

Check your syntax

I have tried to run the Word 6 Macros in the February edition of APC. Both the font macros earn me 'WordBasic Err=100' for the line

```
FormatCharacter .Font = Font-
Style$
```

Also, how does the macro know where to look for the fonts? Suppose I wanted those in CorelDRAW?

The picture macro hangs after receiving the exact address

```
C:\CLIPART\BMP\*.BMP
```

I look forward to your reply.
**NC Hanslip
Sydney**



'WordBasic Err=100' is a syntax error, which means a command was entered incorrectly or misspelled, without seeing exactly how you entered the macro it is difficult to give an answer. The only thing I can suggest is to check very care-

fully what you entered against the version in the magazine (remembering the printing error in line two of the first macro).

The answer to the CorelDRAW question is that you can't use those fonts (without converting them). Microsoft Word uses TrueType fonts that are found in the 'windows\system' subdirectory (all the files with a .TTF extension); these are installed through the 'Fonts' icon of the Windows control panel.

All the Microsoft products, and some other applications which have been designed to use these fonts, can do so. In this way, an application will only be able to use fonts that are installed on your particular system, thereby avoiding any problems.

As for your last problem, the author of that particular macro pointed out that you cannot enter '*.bmp' (for example, filenames or wild cards), as the macro already defines the search as '*.*', that is, it assumes every file in the directory you enter is a picture file. Therefore all you need enter is

```
C:\CLIPART\BMP
```

Richard Goulstone

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The Internet as playground

BY MICHAEL AITKEN

In previous columns we have learnt our way around the Internet — what it is, netiquette, and how to use FTP, telnet and gophers. We're now equipped to check the Net's capacity for serious fun and games.

The Internet has many forums to talk about games. Useful newsgroups include **comp.sys.ibm.**

pc.games. This group covers all games that can run on an IBM PC platform — it doesn't matter which operating system. It has FAQs for game bugs (you're not alone!), and for spoilers (that is, game solutions). The forum moderator asks that people who post spoils label them loudly, so that people don't learn the end of their movie by accident.

Other news groups of general interest to gamers include **rec.games.mud** (Multi-User Dungeons and Dragons), **rec.games.mud.lp**, **rec.games.pbm** (play-by-mail), and **rec.games.pinball**. The game FAQs often have fascinating information — like biographies of great designers such as Sid Meier. If a game is really serious, it gets its own newsgroup. Some high profile games include Empire, Core War, Bridge, Go, Netrek and Xtrek. Chess has mailing lists, gopher and FTP sites.

GameBytes is a free electronic magazine. It has reviews, interviews, reports and screen shots from games. You can find it at the following sites: **ftp.uml.edu**, **wuar.chive.wustl.edu**, or **ftp.funet.fi**. You grab it by FTP, download it to your PC, unzip it, and run the exe file.

The Net has much to offer play by mail game fans. Diplomacy (Avalon Hill's board game) is well represented. There are four automated judges (one runs at **dipvax.dsto.gov.au**).

You can find out what your fellow internauts think of games by checking out the published results in newsgroup **comp.sys.ibm.pc.games.announce**. A dedicated individual collates votes and publishes a top 100. If you vote, he will email the results to you. For the record, a recent top five were: Doom, Civilisation



(still), SimCity 2000, Master of Orion and Raptor: Call of the Shadows.

For chess fans, you can play live against people or computers on one of several chess servers. Telnet to **ics.uoknor.edu 5000**, **bentley.daimi.dk 5000**, or **testbed.access.net 5000**. At **uoknor...**, I found 55 players on an Australian Saturday afternoon, in a large virtual chess club. You can challenge other players to matches, or simply watch a game. The game comes up with an adequate (but no frills) chessboard. If you register with the server it will keep stats on your performance. In true cyber style, there is no sure way to know if you are playing a program or a person.

Try **Telnet fraggel65.mdstud. chalmers.se 4321** to play backgammon. There were around 15 players on deck when I logged in. I had a couple of games with 'Bluto', from Los Altos, California. The board is only character display, but quite easy to use. Despite the distance, the response time was fine.

There are Telnet addresses for Go and Scrabble. The Scrabble address was not answering when I tried it. For Go, try **flamingo.pasteur.fr 6969**. Like many other Net services, these can be intermittent, or busy.

Online service exploits new trends

BY STEPHEN WITHERS

The fact that a cheap piece of software can turn your PC into a terminal should be considered a bonus — a way of connecting to 'legacy' systems. I'm not hugely bothered about the relative advantages of peer-to-peer or client/server technologies for transferring information to and from users, but designing systems on the basis of one computer talking to another is the way of the 90s. Another technology direction concerns multitasking and modularity. When OS/2 first emerged, some people doubted that users really wanted to run more than one program at a time. I'd already learned the benefits of being able to switch applications almost instantly, but I wasn't going to convince DOS diehards used to seeing people sitting in front of 1-2-3 or WordPerfect all day. Instead, I suggested we would see programs becoming more modular. Database packages would no longer be monolithic: one piece of software would take care of the physical storage and management of data, while another would provide the user interface. In the communications field, the terminal emulation portion would be uncoupled from the code that establishes and maintains the connection. I'm not sure I convinced my colleagues at the time, but I'm gradually being proved right.

I recently had the chance to sample an online service that is exploiting both these trends. From its conception, OzEmail was intended to offer multiple logical connections through a single physical link. The company's founder, Sean Howard, once told me he envisaged a system with the potential to bring changes in live data (for example, stock market prices) to the attention of a participant in an arcade-style multiplayer online game. Well, all the services might not be there yet, but the infrastructure is. The OzEmail user software has been developed for Windows and consists of several modules. OzRouter takes care of the connection between your PC and the OzEmail network. Most domestic users will make a direct connection via modem (there are access points in Sydney, Melbourne, Canberra, Brisbane, Adelaide and Perth), but resource-sharing is the name of the game for LAN users. Only one PC (the 'Routing PC') needs a modem, and the other users can tell their OzRouters to communicate through it. (Large numbers of simultaneous OzEmail LAN connection may require multiple Routing PCs.) OzRouter can be configured to connect automatically whenever another module needs to communicate with OzEmail.

The HyperBase application corresponds roughly to the services provided by a conventional BBS. It provides access to message forums (including Internet conferences), downloadable files and images, and information pages (provided by organisations as diverse as the Paradox Users Group and Liquor Network Australia). There are several interesting features in HyperBase. One is the provision for hypertext links from information pages to other HyperBase objects (for

example, a page discussing the effects of particular image-processing filters could point to various image files showing their effects — if you want to see them, they're just a mouse click away, if not, no time is wasted in downloading them). Since information pages are cached by your computer, you can quickly access a page that you (or another user on your LAN) recently viewed — the software is smart enough to check whether the page has been updated and retrieves the new version if necessary. Also, file downloads (up to four at a time) take place in the background, so you don't have to sit staring at the progress display. Finally, it is very easy to create a custom list of HyperBase locations (for example, particular Internet conferences) for quicker access. None of these features are radical, but I don't know of another system that provides them all.

Hands up all those who can't guess what pcMail does? I like the way it supports on and offline message preparation and reading, and in addition to sending messages to other OzEmail users you can also reach Internet, CompuServe and MCI Mail addresses. Your correspondent doesn't have email access? In that case a fax number will suffice. CB Simulator is the chatline-style service familiar to users of many multiline BBS systems. It lets you hide behind an alias (or handle), but the system doesn't reserve aliases for particular users, it simply ensures no two people simultaneously use the same name. A continuously scrolling display shows the aliases of users joining the various channels. As with file transfers, CB monitoring can be minimised; any messages (or just those containing a particular string) will be brought to your attention.

Oz Chat provides a two-way private link between users. A convenient feature of this module is that if you are away from your computer when someone 'rings' you, their details are preserved so you can easily call them back.

Finally, NewsClip instructs OzEmail's computers to monitor the AAP/Reuters and NewsBytes news services for headlines or stories containing particular words. When matches are found, the stories are automatically emailed or faxed to you or any other person you specify — of course, you get the bill!

Talking of charges, OzEmail costs a lot more than your local BBS, but it is more affordable than CompuServe. The standard rates are \$10 per hour, \$5 per hour off-peak. This is reduced to \$2 per hour if you are only using pcMail and OzChat. (The charging scheme is a little more complicated for LAN-connected clients.) Outbound faxes and email messages are surcharged.

It works, the user interface is good (if you like Windows) and it's reasonably affordable. What more can you ask? Next month, I plan to take a look at OzEmail's Internet access services and software.

FTP sites are handy for shareware programs, patches and information. Look for directory trees like /msdos/ games. If you want to try before you buy a game, demonstration versions of many games can be found on the Net. Look for 'demos' in the directory name.

A long list of FTP sites for games can be found at typhoon.berkeley.edu in pub/Library. Some good FTP sites for games are [ftp.um1.edu](http://um1.edu), [ftp.gmd.edu](http://gmd.edu), [ftp.uwp.edu](http://uwp.edu), msdos.archive.umich.edu, [ftp.funet.fi](http://funet.fi)

and wuarhive.wustl.edu. Game cracks can be found at ftp.wup.edu. Try mirror sites in Australia first — say at archive.latrobe.edu.au, ftp.su.oz.au, brolga.cc.uq.edu and others.

The Internet Hunt is a quiz game on the Net, about using the Net. You try to answer questions using the Net's resources, supplying both the answer and how you found it. You can participate, or simply read the questions and answers. The brain child of Rick Gates, this educa-

tional game has been running monthly since September 1992. (Type 1bgopher.gopher.cic.net, and choose item 6).

Use Veronica to search gopherspace for topics of special interest. If you're just net-surfing, try searching on 'games'. You will get hundreds of hits, proving that this article has barely scratched the surface.

In coming months we'll look at more games, including the MUDs and MOOs. maitken@werple.apana.org.au. ▲

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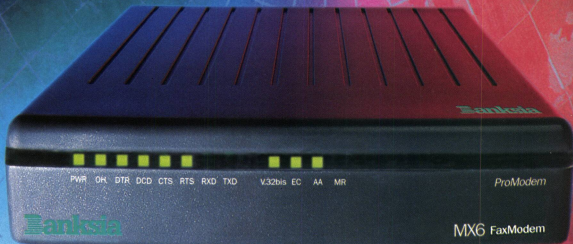
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NEW Systems

NSW

Good Sport BBS (02) 754 2482. P. Doug Tyree. V.21, V.22, V.22bis, V.23. 5pm-11pm weekdays, 8am-11pm weekends.

Star Fleet Command BBS (02) 894 0402. MV. Spock. V.21, V.22, V.22bis. 24 hours.

Wheel Life BBS (02) 558 6782. M. Andrew Magee. V.22bis, V.32, V.32bis. FidoNet 3:712/800. 10pm-8am daily.

ZONE!!BBS (02) 587 6110. MV. Tung Tran. V.21, V.22, V.22bis, V.23, V.32. 6pm-midday daily.

11th Hour BBS (069) 31 1460. MV. Steve Cousley. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:621/302. 7pm-10am daily.

The Hard Disk Drive Cafe (042) 76 4018. P. Tony Ritchie. V.21, V.22, V.22bis, V.32. GTNet 302/029. 24 hours.

The Other Side BBS (046) 28 6858. MV. Ghost. V.21, V.22, V.22bis. 10:30pm-7am daily.

Vic

DIALix Melbourne (03) 562 2399 Multi-Line. MV. Justin Sullivan. V.21, V.22, V.22bis, V.32, V.32bis. Internet Melbourne.DIALix.oz.au. 24 hours.

Picture Man BBS (03) 840 1910. P. Colin and Maurice Freeman. V.32bis. 24 hours.

Update-101 BBS (03) 704 8260. P. Keith Bennett. V.21, V.22, V.22bis, V.32. 24 hours.

The Lonely Little BBS (03) 312 6676. MV. Mr Bond. V.22, V.22bis, V.32, V.32bis. 24 hours.

Transitions BBS (03) 560 4173. P. Stingray. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:636/103. 24 hours.

VCLEYNX BBS (03) 563 5704. P. David Roitman. V.32. 11pm-4:30pm weekdays, 11pm-8am weekends.

Hackers Haven (053) 31 8609. P. Peter Field. V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:637/105. 24 hours.

ACT

Good News BBS (066) 231 1149. MV. Bryan Palmer. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:620/246. 24 hours.

Qld

CyberSpace (07) 358 1925. P. Liming Tieu. V.22bis, V.32, V.32bis, V.32bis. V.32bis. FidoNet 3:640/558. 24 hours.

Dragon's Lair BBS (07) 818 0531. MV. Dragon. V.21, V.22, V.22bis, V.23, V.32. 24 hours.

Goodies & Bits (07) 285 1130. P. Steve Goodwin. V.22bis, V.32, V.32bis, V.32bis. V.32bis. FidoNet 41:400/285. 24 hours.

The Inferno BBS (07) 822 2429. MV. The Bandit. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

Nuclear Fallout (070) 45 2914. MV. Daniel Peacock. V.32bis. FidoNet 3:640/528. 24 hours.

SanTuary BBS (075) 96 1926. P. Masochist. V.22bis. 24 hours.

SA

DIALix Adelaide (08) 231 6822 Multi-Line. MV. Justin Sullivan. V.21, V.22, V.22bis, V.32, V.32bis. Internet adelaide.DIALix.oz.au. 24 hours.

Mystic BBS (08) 284 0068. P. Kyn Dyer. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:800/887. 24 hours.

WA

Absolute Zero (09) 246 1107. MV. Kim Davies. V.21, V.22, V.22bis, V.23, V.32, V.32bis. Internet gworx.it.com.au. 24 hours.

Maximum Velocity (09) 276 1279. MV. Trevor Bloch. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

The Wombat's Burrow BBS (09) 592 3140. M. John Breen. V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:690/398. 8pm-8am daily.

The Fingallian BBS (099) 64 1456. P. Roger Rooney. V.22, V.22bis, V.32, V.32bis. FidoNet 3:690/360. 4pm-6am daily.

Tas

Magenta Black BBS (002) 25 4748. MV. Andreas Modinger and Dale Twydale. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:670/219. 24 hours.

Updates

NSW

2001 Computers BBS (02) 439 6102 Multi-Line [3]. M. Simon Assouline. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:711/506. 24 hours.

AfterShock Possibly offline.

Angus & Robertson Online Permanently offline.

AusKor Information BBS Permanently offline.

Avons Revenge (02) 798 0908. P. Terry Grimley. V.22bis, V.32, V.32bis. FidoNet 3:712/716. 24 hours.

Battle Axe Permanently offline.

Bodyge BBS (02) 554 9076. P. Tom Berger. V.21, V.22, V.22bis, V.32, V.32bis. 24 hours.

Cardnet BBS Temporarily offline.

Cerberus (02) 543 0572. P. Phillip Dearden. V.21, V.22, V.22bis, V.32, V.32bis. 24 hours.

Communications Chaos (02) 820 7082. MV. Christopher Downes. V.21, V.22, V.22bis. 24 hours.

Continental Drift BBS (02) 949 4256. MV. Murray Chaffer. V.21, V.22, V.22bis, V.32,

Submissions

The information in this column is provided by the Australian BBS Registry. It is presented in good faith but APC cannot take responsibility for its accuracy. New information and updates should be sent to the Registry Co-ordinator in your state.

You can also post BBS list news onto the EchoMail conference, BBS_NEWS, which is available nationally as a public area. Netmail BBS list inquiries to Rodney Creer at 3:713/317. Postal registrations to PO Box 731, Penrith NSW 2751.

National Rodney Creer, Australian BBS Registry, [047] 35 6789, FidoNet: 3:713/317, PO Box 731, Penrith NSW 2751

NSW Greg Kuhnert, #1 BBS, (02) 544 7123, FidoNet: 3:712/513

Vic Richard Stocks, The Offline BBS, [03] 808 4510, FidoNet: 3:633/374

ACT Craig Gibson, Caught in the ACT BBS, [06] 292 8288, FidoNet: 3:620/252

Qld James Collins, The Galaxy Gateway Computer System, [07] 812 0727, FidoNet: 3:640/230

SA Grayham Smith, Oracle PC-Network, [08] 234 0791, FidoNet: 3:800/804

WA Graeme Platt, 1990 Multiline, [09] 370 3333, FidoNet: 3:690/254

Tas Roy Austen, Tassie DataBank, [003] 44 9762, FidoNet: 3:670/301

NT Tom Kalai, Kakadu Connection, [089] 48-0068, FidoNet: 3:850/111

V.32bis. FidoNet 3:714/911. 24 hours.

CosmoComp BBS Permanently offline.

Dick Smith Electronics — York Street Permanently offline.

Fire & Stone AMIGA BBS Permanently offline.

FlightPath BBS Permanently offline.

Graphics Warehouse BBS Permanently offline.

Ground Zero Permanently offline.

Home Computing (02) 809 4561. M. David Ready and David Saintry. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:711/455. 24 hours.

Metaverse (02) 631 5994. P. David Baptista. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:713/802. 24 hours.

Microwaved SysOp! BBS (02) 449 6563. M. Bolero Boy. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.

Muirfield Technology High BBS Permanently offline.

OzOnline Permanently offline.

PENTAGON BBS Permanently offline.

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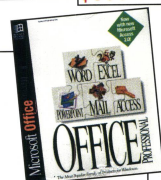
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Cheeseman. V.22, V.22bis, V.32, V.32bis, V.Fast Class. FidoNet 3:712/412. 24 hours.
Serious Operations See Cerberus.
Skylar BBS Permanently offline.
Solaris BBS Permanently offline.
Sonic Aus HQ BBS Permanently offline.
Strictly Business (02) 979 8871 Multi-Line [2]. MV. Michael Wass. V.21, V.22, V.23, V.32, V.32bis, TrailBlazer. FidoNet 3:711/918. 24 hours.
Sydney Portal (02) 797 6181. MV. Alan Ruedlinger. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:712/409. 24 hours.
Tech Exchange (02) 712 3073. MV. Chris Moran. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:712/708. 24 hours.
The Archeon Amiga Mail Server Temporarily offline.
The Big Experiment See Communications Chao.
The Cheese Shop BBS (02) 908 2276. MV. Michael Sirmai. V.22, V.22bis. 24 hours.
The Graveyard BBS Temporarily offline.
THE HAWK BBS See The INFINITE Realm BBS.
The INFINITE Realm BBS (02) 457 9284. P. Andrew Goodwin. V.21, V.22, V.22bis, V.23. FidoNet 3:713/611.1. 9pm-8am daily.
The Kiwi Konektion Permanently offline.
The Next Generation BBS Temporarily offline.
The Software Works (02) 905 7075. M. John Young. V.32bis. FidoNet 3:714/901. 24 hours.
The Sydney Public BBS Temporarily offline.
The Talon BBS See Metaverse (Talon II).
The Warriors Gate (02) 894 0104. M. Ben Johnson. V.21, V.22, V.22bis, V.32,

V.32bis. FidoNet 3:713/806.1. 24 hours.
Thunderdome BBS (02) 360 7541. MV. Paul Towler. V.22, V.22bis, V.32, V.32bis. FidoNet 3:711/920.2. 24 hours.
Cocky's Place BBS Permanently offline.
Down South BBS Permanently offline.
Krikkit One Temporarily offline.
Leeches Paradise Permanently offline.
LyDex Australia Temporarily offline.
Macarthur BBS Permanently offline.
Outback Tardis (080) 87 1122. P. Wayne Orr. V.21, V.22, V.22bis, V.32, V.32bis. 24 hours.
Piros Permanently offline.
Player's BBS Permanently offline.
SENTINAL-BBS Permanently offline.
Sorcim microS Permanently offline.
Squid's BBS Permanently offline.
Technobank (069) 74 1150. MV. Don Cunningham. V.21, V.22, V.22bis, V.32. FidoNet 3:621/701. 7pm-7am weekdays, 24 hours weekends.
The Aura BBS Temporarily offline.
The Erotic Emporium Temporarily offline.
The Jungle BBS Temporarily offline.
The Matrix BBS Permanently offline.
Vector X Permanently offline.
VirtualVisions (066) 29 5169. P. Thumper. V.21, V.22, V.22bis, V.32, V.32bis. 9pm-7pm daily.
Wild Thoughts BBS (047) 22 2337. P. Cheryl Broadribb. V.21, V.22, V.22bis, V.23. Daily: 1800 — 0800.

Vic
Bards Realm (03) 798 1092. P. Steve Lockwood. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:634/397. 24 hours.

Club X See The X Files.
CoolWorld (03) 432 3325. P. Garry Greer. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:635/564. 24 hours.
Cyberdyne Systems (03) 776 8787. MV. Rob Hillis. V.22, V.22bis, V.32, V.32bis. FidoNet 3:632/107. 24 hours.
GeoZ BBS (03) 803 6498. MV. Arthur Stevens. V.22, V.22bis, V.32. FidoNet 3:633/272. 24 hours.
Great Northern Permanently offline.
Network BBS See GeoZ BBS.
Night Owl Theatre (03) 802 2332. P. Laurie Miles. V.32bis. FidoNet 3:635/716. 24 hours.
OZDX BBS Permanently offline.
The CatHouse DownUnder Permanently offline.
The Radio Shack BBS (03) 532 5737. P. Simon Kay. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:635/725. 24 hours.
The X Files (03) 462 1857 Multi-Line [2]. P. Jason Taylor. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.
Vascular BBS Permanently offline.
Victoria Police BBS (03) 369 6714. P. Peter Murdoch. V.22bis, V.32, V.32bis, V.Fast

Class. 24 hours.
VK3KSK Gateway See The Radio Shack.
ACT
Bamboo II, DON BBS Possibly offline.
Joey Sanfrancisco BBS Permanently offline.
The Public BBS Temporarily offline.

Qld
FLAMER BBS Permanently offline.
Melt Down BBS Permanently offline.
T-2000 BBS (07) 209 8336. M. John Albert. V.22, V.22bis, V.32, V.32bis. 6pm-7am weekdays, 24 hours weekends.
The Gameszone BBS Permanently offline.
20 Meg Magic Permanently offline.
Download Unlimited Caboolture See Files Galore.
Files Galore (074) 98 9638. MV. Carlos Lakerdis. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 24 hours.
Lucky the Cat's BBS See The Termination-Zone.
Speed Demon (074) 76 8321. M. Flash. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:640/403. 24 hours.
The ALIEN BBS (077) 79 6109. M. Finn Harder. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:640/725. 24 hours.
The BAUDER Line BBS (076) 91 6258. MV. Tony Carlaw. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:640/450. 24 hours.
The Farmers BBS See The BAUDER Line BBS.
The Termination-Zone (079) 72 7433. P. Steve Watts. V.22, V.22bis, V.32, V.32bis. FidoNet 3:640/742. 24 hours.

SA
Goliath BBS Permanently offline.
Plucka's Bit Bucket Permanently offline.

WA
1984 .. The Revolution (09) 332 1567. MV. Gareth Sampson. V.21, V.22, V.22bis. 24 hours.
Library Network (09) 257 1309 Multi-Line [2]. MV. Colin Wheat. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:690/613. 24 hours.
Lightning BBS (09) 356 5087 Multi-Line [4]. MV. John Strong. V.22, V.22bis, V.23, V.32, TrailBlazer. FidoNet 3:690/601. 24 hours.
Online Information Permanently offline.
Perth's Library BBS See Library Network.
Psychosis BBS See 1984 .. The Revolution.
Hurricane BBS (099) 26 1208. MV. Eddy Taylor. V.21, V.22, V.22bis, V.23, V.32, V.32bis. 6pm-6am daily.

Tas
The Dragon's Weyr See Bear Necessity BBS.
The Rambling RAM BBS Possibly offline.

Format of listings

Entries in our listings contain the following information: system name, phone number, access, operator's name or alias, supported modem standards, network node number and hours of operation.

The access code may be P (Public), M (Members/registered users only), MV (as M, but with limited Visitor access).

The modem standards are V.21 (300bps), V.22 (1200bps), V.22bis (2400bps), V.23 (1200/75bps), V.32 (9600bps) and V.32bis (14400bps). WorldBlazer/TrailBlazer, HST, V.32-terbo and V.Fast Class are defacto high-speed standards.

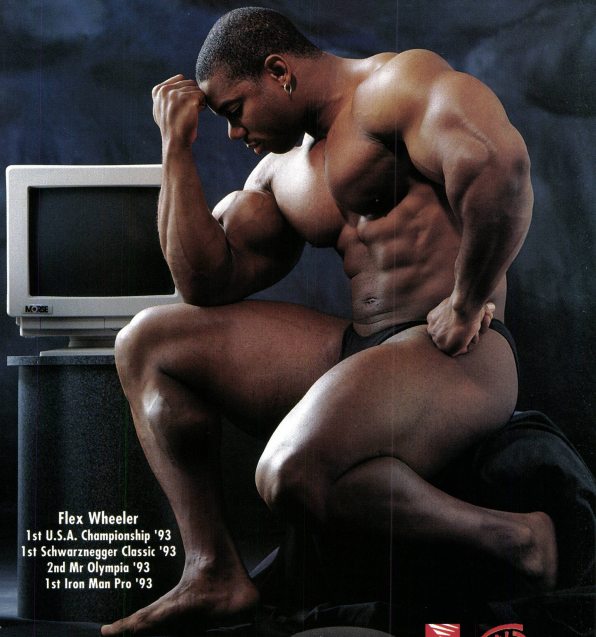
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These networks provide a way of sending public or private messages between boards, whether they are in the same suburb or half a world apart.

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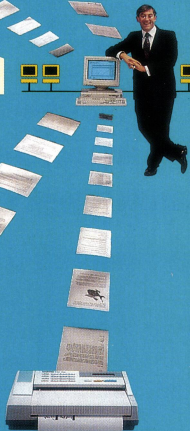
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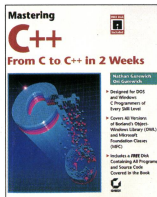
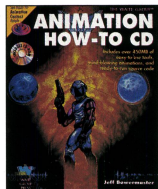
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"Don't even consider doing (ray tracing) on an SX. A 486/33 DX with 4M RAM, a 200M hard drive and an SVGA display (plus, of course, a mouse and CD-ROM) will get you by..." That's what author Jeff Bowermaster tells us at the start of this book. Well, that's told you PC weaklings where you stand!

He goes on to tell us it took three 486s seven months of 24-hour working to put all the material on the CD-ROM together. Personally, I think Jeff is a power maniac. However, if you can get past the "mine's bigger



than yours" syndrome, this book isn't at all bad. It comes with lots of good animations, the code which produced them, a copy of AAPLAY viewing software, plus Polyray ray tracing and a TGA animator program as well, so you do get your money's worth.

The other positive aspect is the author's willingness to explain real basics. So instead of having to figure out why you are entering $y1=y0*\cos(xrotate*rad)-z0*\sin(xrotate*rad)$ you are told it is to help retain the perspective of depth while the cube rotates. Thanks Jeff.

The subjects covered include a good range of basic animations from code which would set any user on the path to competence. The only nagging doubt is: with the rate of progress in hardware and software, how long will it be current?

Jeremy Torr

Mastering C++ — from C to C++ in 2 weeks

Author: Nathan Gorewich, Ori
Gurewicz
Publisher: Sybex
Distributor: The Low Book Company
Telephone: (02) 887 0177
Price: \$57.95
ISBN: 0-7821-1419-9

C++ is one of today's most favoured programming languages. It is a robust, well-structured language that provides small fast executables. In conjunction with Borland's Object Windows Library (OWL) or Microsoft's Foundation Classes (MFC), it is also a popular choice among Windows programmers. Using both theory and practice, *Mastering C++ — from C to C++ in 2 weeks* is designed to give programmers familiar with C a quick and painless upgrade path to C++. The first half of the book is basically concerned with providing an understanding of C++. The essential differences between C and C++ — references, pointers, classes, correct structure and memory allocation — are described in detail. These core essentials of C++ coding form the basis of the authors' 'two week' upgrade course. The remainder of the book is devoted to Windows programming. This is, in turn, divided into two sections: programming

with Microsoft Foundation Classes and Borland's Object Windows Library. The book does not cover Microsoft's Visual C++ and its MFC2 library. It is certainly an advantage to have some Windows programming techniques and preferably in C. Non-windows programmers will have difficulty picking up C++ Windows programming techniques from this text although the instruction provided is easy to follow. Careful examination of sample code and associated descriptive text will provide insight and comprehension into the methods used. This is an ideal book for C users wanting to quickly upgrade to C++. Although basic C++ knowledge can be gained from the text it is not suited to novices without previous programming experience. This is especially true for Windows C++ programming. The example programs included in the text and on a floppy supplied with the book are explained line by line. This method should have readers quickly understanding and (hopefully) writing code. *Mastering C++ from C to C++ in 2 weeks* will certainly fast track readers to competency in C++ programming although it is, by no means, the end of the learning process.

Ben Gerholt

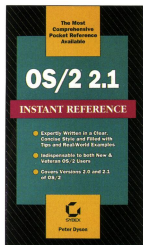
OS/2 2.1: Instant Reference

Author: Potter Dyson
Publisher: Sybex
Distributor: Law Book Company
Telephone: (02) 887 0177
Price: \$25.95
ISBN: 0-7821-1179-3

This book offers a quick and easy to use reference on OS/2 features and commands. It starts with installation, then moves onto the workplace shell, the OS/2 productivity and game applets, and running DOS and Windows programs. The last three sections of the book describe OS/2 commands, config.sys settings and introduce OS/2

batch programming. Yes, it is well written and well presented. But given that OS/2 has been available at around twice this book's price, you have to ask how much value the book adds. The answer is 'not much'. OS/2 2.1 comes with over 600 pages of manuals, and the on-line command reference is large. The Instant Reference has very little that you won't find in the OS/2 package. This book might be useful if you are allergic to online help and your dog has eaten the product's manuals.

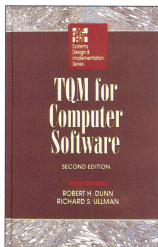
Michael Aitken



TQM for computer software

Author: Robert H Dunn, Richard S Ullman
Publisher: McGraw Hill
Distributor: McGraw Hill
Telephone: (02) 417 4288
Price: \$120
ISBN: 0-07-018314-7

The software industry has raced through its short history. The software equivalent of the industrial revolution has led to software projects of greater size, complexity and responsibility (for example, real time missile guidance), produced in an increasingly competitive environment. In the mainstream, the software artisan has been replaced by



large teams, and the artisan's craft by software engineering principles. This book is about building quality assurance into software engineering. The goal is to do it right, the first time. In 350 pages of close type the authors tell us how to get there. The benefit is lower costs and happy customers. An interesting outline of development methodologies and common software problems is followed by the application of quality principles to all stages of the development process. The authors' focus ranges from project planning methods to coding. Their main argument is that mainstream TQM techniques — statistical measurement in particular — can and should be used across software engineering. They explain a range of assurance techniques. The final chapters cover implementation, and methods for measuring program success. The authors are well versed in the industry and quality movement. This excellent book is easy to read, and offers much to anyone with an interest in software engineering.

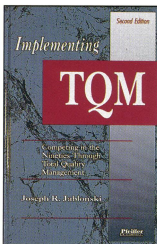
Michael Aitken

Implementing TQM (2nd edition)

Author: Joseph R Jablonsky
Publisher: Pfeiffer & Company
Distributor: Woodlawn
Telephone: (02) 979 5944
Price: \$59.95
ISBN: 0-88390-357-1

Joseph Jablonsky is active in the US quality movement, working as a consultant to organisations wanting to implement TQM. He defines TQM as "a cooperative form of doing business that relies on the talents and capabilities of both labour and management to continually improve quality and productivity using teams". Jablonsky spends most of his 200 pages walking through his (trade marked) "Five-Phase Approach" to TQM implementation. He offers a project plan from start to finish. While it's not a comprehensive manual, the book talks about useful tools, essential tasks and likely problems. Useful resources include sample selection criteria for TQM coordinators and survey forms for customer feedback. He suggests training course content and likely time requirements. He comments on critical success factors (like demonstrated CEO commitment), difficult points in the process, and the pros and cons of using consultants. The book is easy to read. "Adventure is the result of poor planning" is one of the many aphorisms. Like many books by consultants, it is sprinkled with anecdotes. With its practical focus, this book could appeal if TQM implementation is on your agenda. It could be used as a guide for doing it yourself.

Michael Aitken



Visual Basic Superbible

Author: William Potter, Taylor Maxwell, Bryon Scott
Publisher: Waite Group Press
Distributor: Woodslane
Telephone: (02) 979 5944
Price: \$79.95
ISBN: 1-878739-50-6

The *Visual Basic Superbible* may not reach the status of the original but it is fair to say that it will clearly be the work

command is dealt with extensively via descriptions that include purpose, syntax and affected objects. Strong use is made of both tables and graphics to give readers an outline of sets and subsets of commands before the book launches into detailed descriptions. The reams of information included in a work of this type are of little use without a quick way to locate relevant details. The authors, recognising this need, provide an extensive 20 page

index and an 'Alphabetical Jump Table' on the inside front cover. This jump table lists all Visual Basic commands along with the relevant page number on which they are described.

Even if readers don't know the precise Visual Basic command, areas of need can be targeted using the descriptive contents. The *Visual Basic Superbible* is not a beginner's book and does not, in any way, fit the 'how to' mould. It is, rather, an all-encompassing, indispensable

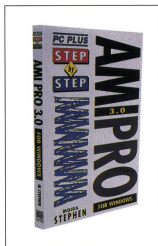
reference guide for Visual Basic programmers. At \$79.95 it is not cheap but should be considered in the context that it will be the only Visual Basic reference guide you will ever need to buy.

Ben Gerholt

PC Plus Step by Step AmiPro 3.0

Author: Moira Stephen
Publisher: New Tech
Distributor: Butterworth Heinemann
Telephone: (02) 372 5511
Price: \$35.95
ISBN: 0 750616 9 89

I appreciated Ms Stephen's focus on trying to teach me the things about AmiPro I didn't know rather than the ones that I already did. Too often supplementary books about generally available applications achieve nothing



more than yet another 240-odd pages which reinvent the wheel and take up more space on the shelf next to the equally unused manual.

Ms Stephen, however, aims at an audience a little further down the techno-track than 'Step One'; turn the computer on.

Aspects of word processing such as bolding, underlining, and so on are quickly dealt with in the section called Appearance of the Text, and the author moves on to more complex and time saving features of the package, such as merging, glossaries, TOCs and multiple documents. The book is illustrated throughout with screen shots, so the reader will know what to look for when working through the process.

Finally, the book deals with an aspect of Lotus applications which the company counts as a major strength — inter/application integration. This section deals with AmiPro and other applications, including mail and Notes, and also a work through on accessing other applications using DDE and OLE links. This section also deals with writing and editing macros, and system administration.

The book has the air of having been written by someone who has enjoyed using the application, and experience shows that teachers who love their subject are generally the most proficient at their craft.

Helan Dancer

Accounting Software In Australia

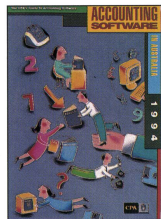
Author: Australian Society of CPAs
Publisher: Prentice Hall
Distributor: Prentice Hall
Telephone: (02) 939 1333
Price: \$44.95
ISBN: 0-724-80232-0

It's not an endorsement, it's a listing. The introduction to this guide makes the point very clearly that this accounting software guide aims to be reference rather than a referral.

Constructed to allow easy access to detailed product and supplier information, the guide has a section each for products, services, and commentary, and boasts listings for close to 250 products and services, for a range of accounting software from the boardroom to lounge room.

The commentary section offers advice from different perspectives on a range of technology and accounting issues, from accounting, information systems and PC purchase standpoints. These add interest for the reader rather than adding specific value to the rationale of the book.

It is certainly a valuable resource, but its soft cover acknowledges its own truth that it is not a product with a long shelf life — within the year there will be enough revisions and new visions to make much of the product information outdated. For this reason, the retail price of close to \$45 is probably a big ask.



reached for by most Visual Basic programmers in time of need. This is not to suggest that these programmers will be able to walk on water after devouring this reference guide, rather it contains every command — with detailed explanations — that Visual Basic coders could ever use from Version 3.0 of this Windows programming language. The authors have broken the Superbible into seven parts that cover the basics of Visual Basic programming through to the complexities of managing data flow. Most chapters conclude with a sample program (or project) that, in the authors' own words, "... ties together all the details of that chapter". Readers don't have to recreate sample code for these projects as it is included on the 3.5 inch disk supplied with the book. It is impossible to give even an overview of the material contained in the book's 1700 pages. Suffice to say that each Visual Basic

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Righteous Fire

By NATHANIEL TUNBRIDGE

Set one year after the events of Privateer, the add-on game Righteous Fire

will keep you jumpin' and pumpin' for many nights to come.

Righteous Fire is here, the first add-on disks for the classic Privateer. At the end of the original game, the Steltek aliens powered up the gun I had found on the derelict ship in Delta Prime, allowing me to blast the remote drone that had been hounding me. At the beginning of Righteous Fire, I find myself on Jolson pleasure base, being informed by station security that my beloved Steltek gun has been stolen. There was nothing to do but head off into space and try to get it back.

First stop was with the ship dealer, for a major refit of my old Centurion. Righteous Fire features several new ship upgrades. The Fusion Cannon costs 100,000 credits but has firepower second only to Steltek. With four of them on my front rack, I could destroy many craft with only two direct hits. A Gun Cooler makes rapid, full-power fire a reality, and a Shield Regenerator speeds up the usually slow process of shield regrowth. The Speed and Thrust Enhancers gave me a maximum set speed of 585kps and a top Afterburner

Isometal armour to protect the whole investment. A new Advanced Repair Droid, small and red, replaced the slower, bulkier, yellow repair droid.

With the ultimate death machine armed to the teeth, I headed for the peaceful University planet of Oxford in search of answers. It turned out to be a good guess. The librarian Masterton, the wily old green-eyed bookworm, knew of a 'friend' who may be 'useful'. Of course, I had to run some missions for him, and for pirate contact Lynn Murphy and for Sandra Goodwin at the Perry Naval Base (meeting, en route, an entirely new, small, ultra-manoeuvrable Kilrathi craft of unknown origin), before the friend would meet me at Macabee base in the Nexus system.



Unknown persons have tampered with a spaceship registered under your name.

speed of 1168kps, maintainable by dropping down a shield strength. In the area of shields, Level 4 shield generators and also Level 4 engines were now available, as was

Monte turned out to be a worried sociologist, although he looked more like an accountant with his severe dark suit and slicked-back grey hair. After flying him to New Detroit, he revealed (at last!) some information, telling me of Mordecai Jones, new leader of the now united Retros, and the man responsible for the sudden rise in Retro triumphs. As I ran missions for him (taking documents to the Informant at a secret pirate base, eliminating the Retros who ached for his demise), he gradually told me more, about a

Governor Menesch, a man with an open bounty on his head from both Sandra Goodwin and Lynn Murphy. Monte explained that Menesch was a two-way fixer,

supplying ships to the Kilrathi and the Retros, and possibly the man who stole my gun. He couldn't be specific about his



whereabouts, however, only saying that he was somewhere in the Troy, Pyrennes, Regalis or Pender's Star systems. I cleared them all, destroying every moving object I encountered to be sure I didn't miss him. I found him at the Freja jump point in Regalis system, protected by those small, mysterious Kilrathi craft that, it now transpired, were piloted by Church of Man fanatics! While I was busy wiping them out, Menesch jumped out, leaving the fond farewell, "I'll leave you to your death." I followed him to the barren Freja system where, after wiping out two entire wings of the killer mini ships, I went one-to-one with Menesch and blew away his Centurion with torpedoes. **To page 238**

Where do you get it?

Distributor: Electronic Arts
Phone: (075) 911 388
Price: \$44.95

The Hanna-Barbera Animation Workshop

Distributor: Directsoft Australia
Phone: (02) 489 7853
Price: \$79.95

New from the Hanna-Barbera company, although made in the UK by Empire, is this one-disk animation package. Animation Workshop features a number of drawing and animation tools to help the budding cartoonist put down some pics. Since the program is aimed at the younger audience, we called in animation expert Bronwyn Paynter, aged 11, to help us evaluate the product.

With a lot of manual-gazing we managed to get past the copy protection screen. The main menu screen is divided into three main areas: the main control area with the six control icons for the program, the animation control panel used to control the animation display, and the exposure list which shows the order of frames making up the animation. Rather than try to fiddle around with these, we took the manual's advice and looked at some pre-drawn Hanna-Barbera animations. They loaded easily enough, although we had a little problem in that only seven or eight frames could load into memory, even though we had a machine with 4M of memory and 2M was recommended. We were still able to watch The Jetsons do a [brief] boogie, see Yogi Bear (almost) grab Boo Boo, and watch Fred Flintstone get hit on the head.

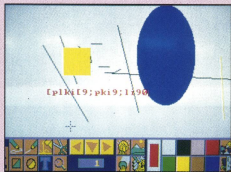
Taking a liking to Fred's painful predicament, Bronwyn found out from the manual how to load in a new background. With a little bit of help, we managed to load in Barney as well. It's also possible to colour the existing animations to your own specifications.

What strikes one immediately about the appearance of the work screen is the utter lack of text. Perhaps in an effort to keep

the display simple, the designers have relied entirely on icons to control the action, and called this the Icon Animation System. This isn't a bad idea, and it's fairly easy to get used to, but it makes things a little bit awkward to begin with. Without any descriptions underneath the various buttons we had to refer constantly to the manual for the meanings of various icons. This could have been solved by the inclusion of a right-mouse-button help feature for each icon, a feature that is so helpful and obvious it should be made mandatory for all mouse-driven and/or icon driven programs. The display is also a little bland in colour. For fans of the cartoons, though, this may be worth looking at, and the package is available for a time with a free Tutorial video which includes an episode of the Flintstones.

Bronny's verdict? "Pretty good," she decided, "but not as good as Crayola", referring to Crayola's Amazing Art Adventure she reviewed in the June issue of APC. Was Animation Workshop easy to use? "Yeah, but it was more complicated than Crayola. Crayola was easier to understand and access," Ms Paynter pointed out.

Bronwyn Paynter and Nat Tunbridge

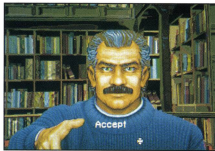


From page 237

It was much the same when I went up against Mordecai. After performing a whole history of missions, including joining with Commodore Uhler and clearing Kilrathi from Blockade Point Alpha, also destroying Kahl, Top Cat Commander of the Sixth fleet into the bargain, as well as clearing Death, Pestilence and War systems for Admiral Terrell, I finally located the Church of Man base, Gaea, and Mordecai himself, surrounded by a swarm of his lethal Elite guards.

I lost count of the number of Steltekl-blasting Elite guards I downed. After four or five Mordecai was prompted to scoff; "Fool! My Elite Guards cannot be destroyed!", although after a few more he didn't sound so confident. "It cannot be! Perish, infidel trespasser!" he demanded, obviously upset. The last guard died in a furious explosion, crying "I may die but the Church will live on!" and then I hunted Mordecai down in an asteroid field and blew him away after a lengthy battle. As he died, a Talon jumped out of nowhere, too late, declaiming "Brother Jones! I shall avenge you!" After destroying this maniac I used the revealed jump point to get to Rikel and from there

made my way to Perry and the Admiral's heartfelt thanks and congratulations (and 80,000 credits). In closing, I popped into the Drake pirate base and collected my bounty from the informant, who thanked me but warned "We are once again deadly enemies!"



Righteous Fire is huge! Like Privateer, one can at any stage leave the plot for a while and take a wander through a nearby system; in my case this was for the purposes of robbery, murder and wholesale destruction.

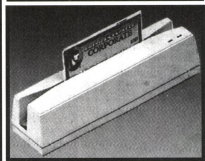
An unexpected pleasure occurred when I started collecting ejected pilots; when I landed on any base, these would

turn into Slaves. A contraband cargo, certainly, but a valuable commodity nonetheless, and an entertaining fate for an innocent member of the Merchants Guild or hotshot navy pilot. Since I was running all this illegal cargo, the Militia would attack me on sight, and every Gladius or Talon that moved towards me had to be destroyed. By the end of the game I had accounted for over 150 Militia craft alone. My total kills numbered 724.

With the addition of the Privateer speech pack, Righteous Fire really came alive. The shrieking fanatical woman from the Church of Man ("Reeveeeeeeent! And accept our *righteous* judgement!"), the lazy drawl of the pirate ("Lookin' sharp, ace."), and the growl of the Kilrathi ("Monkey boy! You make me laugh!"). All the sound effects that ennobled the original, like the whoosh of passing asteroids, the doppler whine of an enemy ship brushing near to yours, the clank of an object being sucked into the hold by your tractor beam, and that awful banging sound when your shields take a hit, are all in place. Righteous Fire is immaculate, perfect, essential. I have only one complaint: I didn't get my gun back!▲

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Special Systems to cover more numbers while playing less games	Yes	Yes	Yes
Number of Special Systems included	254	27	27
Highest Special System Supported	45	20	20
Ability to Generate your own systems	Yes	No	No
eg. Cost to play Special 5/6 System 10	\$6.20	\$7.90	\$7.90
eg. Cost to play Special 5/6 System 16	\$168.00	\$260.70	\$260.70
eg. Cost to play Special 5/6 System 20	\$445.60	\$1453.60	\$1453.60
eg. Cost to play Special 4/6 System 16	\$16.00	No	No
eg. Cost to play Special 4/6 System 18	\$29.80	No	No
eg. Cost to play Special 4/6 System 20	\$51.70	No	No
PRINTS Lotto/Pool Coupons All Printers	Yes	1 Printer	No
*Autocorrelation Pattern Predictor chooses the numbers for you	Yes	No	No
Previous Draw Game Reduction	Yes	No	No
Ball curve reduction	Yes	No	No
Odds/Events reduction	Yes	No	No
Consecutive number reduction	Yes	No	No
Boxing reduction	Yes	No	No
Mouse Support	Yes	No	No
Multiple Resizable Windows	Yes	No	No
Ball Curve Analyses	Yes	No	No
Most/Less Analyses	Yes	No	No
Following Pairs Analyses	Yes	No	No
**Highest Winning System Analyses (Scan)	Yes	Yes	No
Odds/Events Analyses	Yes	No	No
Number of Databases included	256	4	4
User Defined Databases	Yes	No	No
Compares and Calculates Winnings	Yes	Yes	Yes
Trail Play ANY System over Any Range	Yes	No	No
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PC Super Market

JULY 1994

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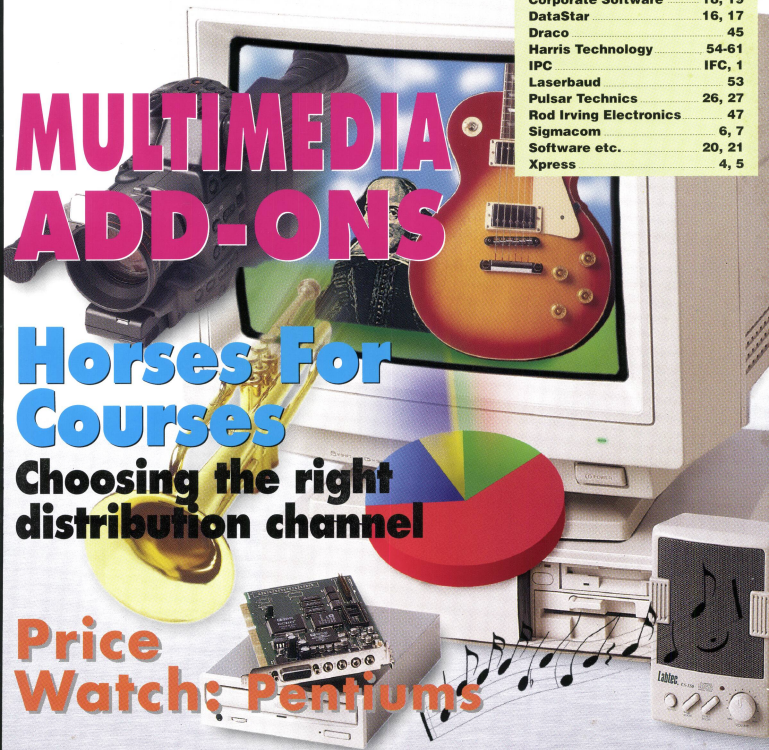
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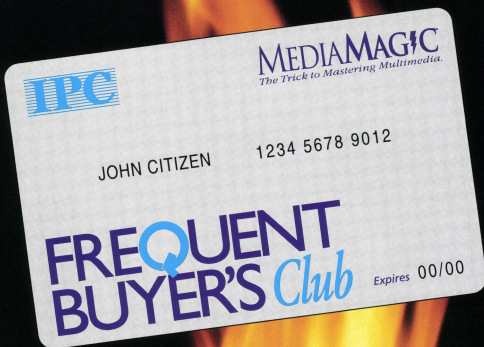
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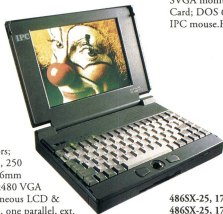
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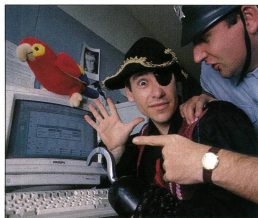
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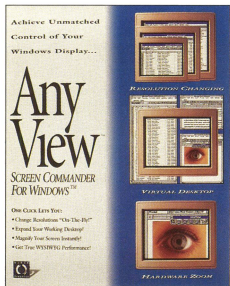
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News

Don't be keel-hauled



New and improved

AnyView allows users to change resolution and switch colour depth

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Satisfied with a PC that can call up 24-bit images, digitise speech and play CDs? The scope of multimedia can go beyond this limit. Like newspapers, voice mail, TV, live video... all in the one box and all with the one smooth interface.

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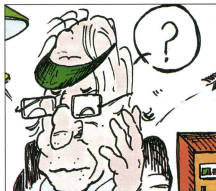
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This comparison chart lists over 140 CD-ROM titles.



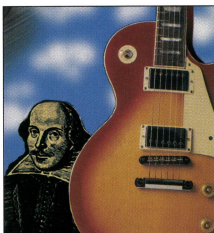
Company Profile

Pulsar Technics — small beginnings



Horses for courses

Our form guide to choosing the right channel



Multimedia add-ons

More than pictures and sounds

PC SuperMarket

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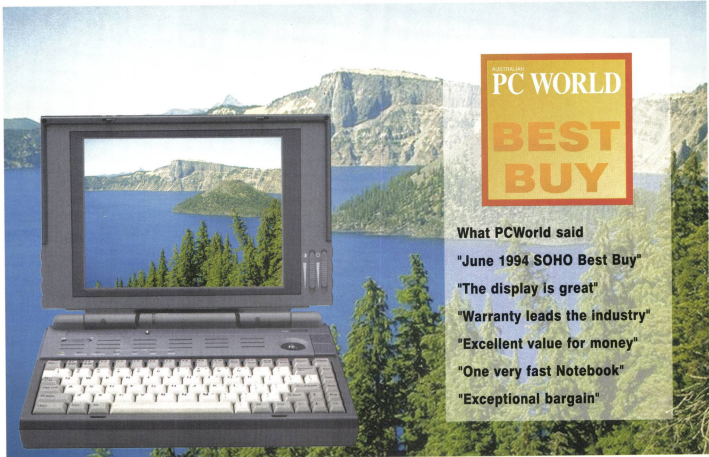
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- Macro Assembler 6.11 \$244
- Money \$62
- MS-DOS6.2 Upgrade \$86
- Office Professional \$831
- Office Standard \$753
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- Project \$760
- Publisher 2.0 \$154
- QuickPascal Compiler \$151
- Visual Basic Windows 3.0 \$244
- Visual Basic Win. Pro 3.0 \$538
- Visual C++ 1.5 CD \$589
- Windows 3.11 \$151
- Windows for Workgroups \$173
- Windows NT CD 3.1 \$538
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- Word 6.0 Windows \$480
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- Works for Windows \$154

omniPAGE

- Omnipage Pro Scan 5.0 \$1146
- Omnipage Direct \$432
- Pagekeeper Personal \$453
- Fax and Find \$467

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- WordPerfect 6.0 Windows \$463
- Letterperfect 1.0 \$162
- Intellitag 1.0 DOS \$663
- Wordperfect Works 1.0 \$172
- Planperfect 5.1 DOS \$234
- DataPerfect 2.3 \$465
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- Anti-Virus Windows 2.0 \$154
- PC Tools Pro DOS 9.0 \$170
- PC Tools Windows 2.0 \$143
- XTree for Windows 2.0 \$118
- XTree Gold DOS 3.0 \$1751

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- Harvard Graphics Win CD \$201
- Superbase Windows 2.0 \$161

Corel

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- CorelDraw V4 \$615

Quantum 1.8 Gig Fast SCSI 2 HD \$1849

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Helpline has been set up to provide a service for PC SuperMarket readers and also as a forum for feedback. If you have trouble locating a specific product, write to PC SuperMarket Helpline, Level 6, 54 Park Street, Sydney 2000 or fax your request to us on (02) 267 4909.

Please include the name of the product or manufacturer and also your phone number. We will be in contact as soon as we can.

Please be aware that this service is not a direct phone inquiry service, nor do we recommend products or diagnose computer ills through the mail or by phone.



I refer to your contributions to the review of colour printers in the January 1994 edition of *Australian Personal Computer*.

I am looking to buy a colour printer and your article has nearly convinced me to purchase the HP 1200C. However I cannot find anyone to properly demonstrate it and am not sure whether to use a Mac or a PC to drive it.

The best inkjet printer I have seen is the Canon Colour Wizz driven by a Mac computer. How does it compare in your view to the HP 1200C? Unfortunately the APC printer review did not include the Canon Colour Wizz.

Do you know anyone who can provide some first rate advice on putting together an HP-IIICX scanner, HP 1200C and PC?

As a closing note may I suggest that APC run an article on identifying the better software and hardware retailers. The support for the HP1200C is appalling. One of the dealers I rang, whom was recommended to me by Hewlett-Packard, said they only had the HP1200C hooked up to a black and white hand held scanner — not much use for a colour printer!

David Brumby
Roseville NSW

PCSM ran a feature written by Mike Lutting in May where he reviewed the printers mentioned.

Your comments on the Hewlett-Packard pre-sales support are interesting and I hope that Hewlett-Packard and other distributors take note. While HP may not deal directly with the public, the delegation or palming off of sales inquiries to dealers needs to be qualified — otherwise the inevitable occurs as demonstrated in this letter.

As for running articles on better retailers, PC SuperMarket does do a monthly profile on companies. However, we do not rate nor recommend retailers.

Have you tried user's groups for advice on setting up your system? This may well be a good source for finding a retailer or VAR who specialises in your application need. Sydney PC User's Group can be contacted on (02) 972 2133.

The other source is to use a consultant to look at your system — however this may be expensive.



A client has asked us about the program Quark Xpress for PCs. We know that this program is available but cannot find the distributor. We have tried Merisel, Tech Pacific and Sourceware but have not had any luck. We would appreciate it if you could supply details for Quark Express' Australian distributor.

Greg Beard
Mandurah WA

The Australian distributor for Quark Xpress is Mitsui Computer which can be contacted on (02) 452 0452.



I saw some software advertised in APC which is used to write in English and then convert what is written into another language.

I would like to know if you have the address of the business which was advertising this as I wish to purchase this software.

P Calahorra
Smithfield QLD

We cannot identify the specific ad to which you refer. However, the company Software Etc, which can be contacted on (02) 905 6010, distributes software which does language conversions.



Whatever happened to DR-DOS 7.X.? Last I heard of it was about a year ago with an expected shipment date after winter. It did not say northern or southern winter.

Has it been scrubbed?
James Foley
Caloundra QLD

Digital Research has been bought out by Novell.

The DR-DOS you refer to is now known as Novell DOS 7.0 and has been out since early this year. The current recommended retail price is \$99.

For more information, contact Novell on (02) 925 3800.▲

Bulletin boards can be software jeopardy

By now we all know that to borrow, copy or pirate software from friends or workplaces can get us into a heap of trouble. The BSAA has aggressively targeted small and medium-sized businesses, as well as home users, with the message that it is illegal and, if you get caught, expensive.

The Copyright Act provides for fines of \$500 for a first offence up to \$250,000 for repeat offences, or company actions. You could buy a lot of legitimate software for that much money.

What recourse do you have to 'free' software then? If you take disks from work, someone might see you and do you in, as part of the BSAA's celebrated 'Dob In A Pirate' campaign which has seen more than \$10,000 awarded to people willing to spill the beans on employers and colleagues.



The BSAA is aggressively targeting BBS piracy

So wouldn't it be tempting to think that bulletin boards, with false names and a faceless screen anonymity would be a safer bet?

Bzz, wrong, but thanks for playing software jeopardy anyway. The BSAA has proven it is just as well versed at bulletin board piracy spot-

ting as the everyday disk-filching kind.

Jarrad Webb, who had been running the Cove bulletin board in Adelaide, and using it to illegally supply software developed by Microsoft, Aldus Software and Autodesk was recently charged in the Federal Court of Australia, and fined an undisclosed amount in damages to the three BSAA members whose licences he had violated.

As well as the software piracy charges he was fined for contempt of court, after failing to comply with the terms of the Anton Piller order, which mandates that the materials alleged to be pirated, and specified in the order, can be seized by the court to be held in evidence. Webb had tried to delete files which contained the pirated applications before the Anton Piller order could be served, according to BSAA lawyers.

The judge, in handing down his findings, said that his decision in awarding the fines was based on the clear evidence that the copyright infringement was completely deliberate, and sustained.

He signalled the fact that infringements of this kind were by their nature difficult to track and detect, and that punishment should be meted out in due proportion, in an effort to deter further incidents.

No such thing as a free lunch? There's no such thing as free software either, so start saving. But if the BSAA's independent research released last year is anything to go by, the average street price of a business application is a little less than \$190, so you won't have an endless wait.

By Helen Dancer

Bargain corner

Micrografx Australia has announced that the award-winning flowcharting software product, ABC FlowCharter 3.0, will begin the 1995 financial year with lower pricing. The new recommended retail pricing from 1 July 1994 will be \$495, a price reduction of \$200. All Micrografx products are distributed in Australia by Merisel and Sourceware.

Microsoft has been heavily advertising bundled software packs recently with offers available until the end of July. The three bundles or packs are the Microsoft Office Pack, the Microsoft Home Pack and the Microsoft Power Pack.

The Microsoft Office Pack includes Microsoft Office (which in itself includes Word, Excel, Mail, Access and PowerPoint), Microsoft Publisher and Microsoft Money. It retails for \$875. The Microsoft Power Pack contains MS-DOS 6 Upgrade, Windows for Workgroups and a Microsoft Mouse and sells for \$229. The Home Pack also costs \$229 and includes Works, Creative Writer and the Entertainment Pack. All packs include the Microsoft Service Guarantee which is valid until the end of September. Microsoft is offering one-off promotional specials on individual software including Microsoft Mail for Office for \$795.

Symantec has developed the Network Series Solution — a range of products designed to increase administrator productivity, reduce costs and protect valuable corporate information. The products include the Norton Administrator for Networks, Norton Enterprise Backup, Norton AntiVirus for NetWare, Norton Desktop for Windows 3.0, Network Menuing Admin Pack 2.2, Norton Utilities Administrator, Norton pcANYWHERE and Norton DiskLock Administrator. The products are available separately on a licence basis per node. Bulk site and volume discounts are available.

New & Improved

NEWS OF ANNOUNCED PRODUCTS AND UPGRADES

By Nat Tunbridge

NEW

AnyView looks fine to Binar Graphics

Subtitled 'A Screen Commander for Windows', AnyView provides what producer Binar Graphics claims is the first set of display control utilities for Windows. It allows users to change resolution, switch colour depth, and zoom in to a specific portion of the screen.

A 'virtual desktop' feature is also included, which extends the workspace beyond the actual screen size, according to officials. An accompanying 'bird's eye view'

feature provides users with quick access to open applications via a pop-up window containing a thumbnail sketch of their entire virtual desktop.

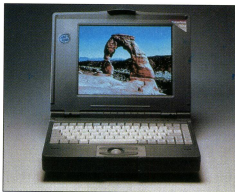
AnyView retails for \$130. For more information contact Sealcorp on 1 800 659 508.

NEW

Acer's new line-up

Acer Australia has announced a plethora of new products, including two new high-end colour notebooks, two new multimedia machines, a series of desktop PCs and a high-performance multiprocessing server.

The new AcerAltos 17000 server represents Acer's claim of a symmetric multiprocessing server under \$24,000. It provides support for up to four Pentium processors, and possesses Error Correcting Code memory. The design also includes a 64-bit memory subsystem, with disk array subsystem support. The 17000 also features a 256K second-level write-back cache on each CPU and true 64-bit FrameBus architecture. The Acer-



the 433sz with 210M hard disk and goes through to \$4052 for the 466vp PCI machine with 420M hard disk, Acer stated. The AcerPower range starts at \$2415 for a base-configuration 433svp

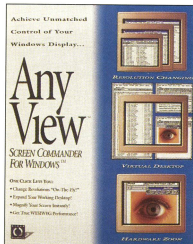
Altos 17000 60MHz is available for \$23,192.

The new desktops from Acer come in the AcerMate and AcerPower ranges. The AcerMate range includes the entry-level AcerMate 486/g 'super green' series, replacing the current AcerMate series and offering 210M hard drives, local bus IDE technology and power consumption of under 20 watts during inactive periods, and the AcerMate 486/vp series, incorporating entry-level PCI-based machines providing 1M VGA on board with two PCI slots and two ISA slots, Acer officials claimed. The AcerPower range consists of the 586/p PCI series, combining Pentium chip and PCI bus technology and the EISA series. Pricing for the AcerMate range starts at \$2552 for

without hard disk, up to \$6951 for the 560we EISA machine without hard disk.

Acer's new colour notebooks, the AcerNote 760c passive matrix and AcerNote 760cx active matrix, include local bus with either an Intel DX2/40 or DX2/50 CPU. Aimed at small to medium-sized businesses, the 760c features a DualScan STN colour LCD, which Acer claims improves display quality, and costs \$5945. The 760cx series supports TFT colour LCD or active matrix LCD, and costs \$8085. Both machines come standard with 250M hard drive, PCMCIA type III slot, and 4M RAM expandable to 12M.

The two new multimedia PCs are the AcerPAC 450vpi model 210 and the 450vpa model 210, both of which



come standard with 16-bit sound, two stereo speakers and 486DX2/50 processing power. "We have also included a twin-speed CD-ROM drive, a Photo CD viewer and two PCI slots to further enhance these machines," an Acer official said. The AcerPAC 450vpa model 210 is available at the price of \$4015. The AcerPAC 450vpi 210 costs \$4198.

In addition, Acer's new AcerMagic M1 upgrade kits enable the new AcerMate and AcerPower series PCs to

For more information contact Quarterdeck on (02) 369 2711.

NEW

Nikon play Touch

Nikon has announced a new high-end full-colour flatbed scanner. Focused on users requiring accurate scanning with Optical Character Recognition, the Nikon Scan-Touch is described by officials as being "designed for applications such as graphic

arts, design, advertising and general office automation."

The Scan-Touch can read both colour and monochrome images from reflective artwork or transparencies up to 216mm by 236mm. It features 24-bit

full-colour scanning with an optical resolution of 565 by 1200dpi interpolated to 1200 by 1200dpi, and employs a 10-bit three pass scanning method and balanced fluorescent light source. There are three different scanning speeds, the fastest of which enables a scan of colour data (A4 300dpi) in about 30, seconds, according to Australian distributor Maxwell Optical Industries. The company can be contacted on (02) 660 7088.

NEW

DEC's advert for the environment

Digital Equipment Corporation has announced the DECpc LPx+ series of personal computers. The new LPx+ family completes what DEC calls its 'first stage' of Digital 'green' PCs; the company claims that all Digital desktop models have been replaced with energy-efficient machines. According to DEC officials, the new DECpc LPx+ bears the same



specifications (and price) as its predecessor the LPx, except that it also features Advanced Power Management. Prices for the range start at \$3965.

Contact DEC on (02) 561 5252.

NEW

Toshiba ISD says the pen is mightier

Toshiba Information Systems Division has released what it claims is the first colour pen tablet computer, the T200. Based on an Intel 40MHz i486DX2 processor and featuring an 80M hard drive, a lithium battery, and both Type II and III PCMCIA expansion slots, the T200 comes with either a 9.5in transreflective STN-monochrome or Dynamic STN dual-scan colour screen.

"These features have been developed in response to customer feedback from the healthcare, utilities maintenance and field force automation markets," Toshiba officials said.

Weighing in at 2kg, the T200 measures 270 by 41 by 210 (WHD), and features local bus video, hardware graphics accelerator and 4M RAM expandable to 20M. Windows for Pen Computing

software is preinstalled. When being used at a desk, the unit can be connected to a monitor, an external floppy disk drive and a specially developed keyboard, Toshiba claims. The T200 series starts at \$6262.

Contact

Toshiba ISD on

008 021 100.

NEW

TCG presses Seiko's Point

The new Seiko Personal ColorPoint PS Printer distributed in Australia by TCG produces 300dpi, thermal-transfer colour prints on cut-sheet laser-quality plain paper and overhead transparencies, officials claimed. Awarded the Editor's Choice by *MacWorld* magazine, the unit has 6M memory, PostScript language, is Pantone-certified with a maximum of 16.7 million colours supported, and is compatible with PCs, Macintoshes and Unix workstations. The ColorPoint weighs in at 19kg and comes standard with bitmap smoothing, enabling 72dpi



be converted to multimedia functionality, Acer officials stated.

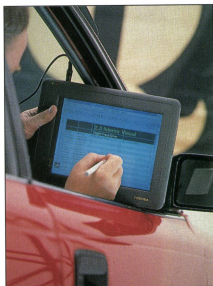
Acer can be contacted on (02) 870 1999.

IMPROVED

A updated view from Quarterdeck

Quarterdeck Office Systems has announced that DESQview/X Version 1.x users can now upgrade to DESQview/X Version 2.0 for \$125. Any other registered Quarterdeck user can purchase DESQview/X 2.0 for an introductory price of \$225. The program has a standard price of \$395.

Described by Quarterdeck officials as "the premier solution for running Microsoft Windows in an X environment," DESQview/X 2.0 includes a TCP/IP protocol, including SLIP and PPP for serial lines, DOS/UNIX printer sharing and file transfer, TELNET, a 3270 emulator and enhanced security features.



BEST BUYS

screen images to be printed at 300dpi resolution, and 39 fonts. The printer is priced at \$6931.

TCG also announced the Seiko PSF A3 colour printer, which it claims is the first printer to offer a choice of dye sublimation and thermal-wax technology in a single unit. Officials claimed the dye sublimation produces near photographic 300dpi images with 24-bit continuous tone colour, for use in areas such as graphic design, medicine, architecture and science. The thermal wax offers cheap, fast colour on paper or transparencies, TCG officials claimed. Features of the Seiko PSF include 104 Adobe fonts, 24M memory, four Ethernet options and colour matching abilities including EFI EfiColor, Apple ColorSync and Agfa's Foto Tune. Compatible with PCs, Macintoshes and Unix workstations, it costs \$32,833.

TCG can be contacted on (02) 698 5000.

NEW

Austel approves New Media PCMCIA fax modem

US-based company New Media Corporation has begun shipping its Austel ap-

proved fax/modem. Boasting send and receive speeds of up to 14.4K data and four times data compression to maximise throughput up to 57.6K, the Group III fax

comes bundled with WinFax Lite software. MNP10 provides enhanced error correction for cellular applications.

In an effort to lessen the drain that PC cards cause on notebook batteries, officials claim the New Media card uses 140mA in operation and 45mA in standby mode. It comes bundled with System-Soft CardSoft software to provide for insertion and removal of cards while applications are still running. The New Media fax/modem card comes with a three-year warranty and retails at \$695.

Contact Australian distributor Advanced Portable Technologies on (02) 906 3800.

NEW

Sharp releases new laser printers

Sharp Australia has unveiled two new laser printers in an attempt to bracket both ends of the market. The JX-9400, aimed at the 'budget-conscious' market, is a compact 6ppm printer with a 330 by 365 footprint, made possible by the 250-sheet paper cassette being built into the main body of the machine. Print resolution is rated at 300 by 300, and five emulations are

featured, including HP's PCL 4 and Epson's FX-80. The JX-9400 has a base memory of 512k expandable to 4.5M, and an optional RS-232C interface is available. It costs \$1195.



Targeting the "larger corporate, government markets," the JX-9460 is the 9400's big brother, although not in terms of size: it has the same diminutive footprint. Peculiar to it, though, is its auto-sleep power-saving feature. In terms of power, the 9460 has a print resolution under PCL 5 of 600 by 600. A PostScript option is available, to give 35 outline fonts and 34 levels of greyscale. A base memory of 1M is standard, expandable to 9M, and an AppleTalk option is available. The JX-9460 costs \$1595. A review of the Epson Colour Stylus will appear in First Looks, APC August 1994.

Contact Sharp on (02) 831 9111.

NEW

The PowerView comes into Focus

New high-resolution LCD projection panels developed in the US by In Focus Systems are now available in Australia through Electroboard. The PowerView 950 and PanelBook 750 reproduce whatever is currently on an attached monitor at 1024 by 768 resolution. Placed on top of an overhead projector, which provides the light source, the machine works as an electronic foil, allowing the screen's contents to be displayed on a much larger scale without blurring. Electroboard claims that applications for high resolution LCD include

training, presentations and work group computing. The PanelBook 750 weighs in at 2.4kg and has a 241mm by 511mm by 292mm display with 1024 by 768 resolution of-

fering 24,000 colours. It costs \$17,900. Its big brother the PowerView 950 has a 26.4cm diagonal active matrix LCD screen for full-motion graphics and video, capable of 1.4 million colours with 1024 by 768 resolution. It weighs in at 2.8kg, measures 333cm by 53mm by 386mm and costs \$22,000.

For more details contact Electroboard on (02) 437 4444.

NEW

A Jubilee for scanners

Scanner manufacturer Tamarack Telecom and its new Australian distributor Jubilee International have unveiled the ArtiScan range of desktop flatbed scanners. The range covers both 24-bit three-pass and 30-bit single-pass scanning technologies with 600, 800 and 1200dpi resolutions, and is designed for both Apple and Windows environments. The software included is 100 per cent TWAIN compliant, and features interactive colour previews, multi-algorithm gamma correction and image enhancement filters.

Accessory devices such as Slide Kits for scanning transparencies and X Rays up to A4 are available for all models as well as new Automatic Document Feeders for OCR. Prices for the ArtiScan range start at \$2205.

For further details call Jubilee International on 1-800-062-789.



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SOFTWARE

- | | |
|--------------------------|-------------------|
| MS Works for Windows 3.0 | \$140.00 |
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| MS Money 3.0 | \$69.00 |
| MS Windows 3.11 | \$140.00 |
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| MS Creative Writer 1.0 | \$69.00 |
| MS Discosave | \$65.00 (CD ROM) |
| MS Encarta 1994 | \$189.00 (CD ROM) |
| MS Golf for Windows 1.0 | \$69.00 (CD ROM) |



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The MultiMedia SoundBook is the most powerful Notebook available and the first high performance MultiMedia Notebook in Australia.

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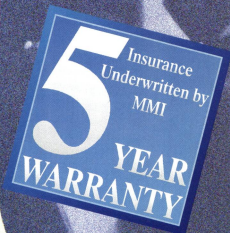
When pitted against 'Big Name-Big Dollar' competitors, the experts considered the SoundBook and concluded ...

"... one very fast Notebook ... extremely large RAM capacity ... the largest hard drive of all the Notebooks ... excellent value for money ... the XPRESS has a lot to offer ... exceptional bargain ... the display is great ... offers great buyer confidence ... Warranty leads the industry ... a safe buy ..."

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QLD	Adelaide	Prodats Solutions	08 239 0505	WA	Hobart	Tasmania Communication Supplies	002 34 6898
	Adelaide	XEL	08 231 0303		Launceston	KM Computers	003 43 3206
	Brisbane	Divited	07 391 0111	WA	Launceston	Quadrant Computers	003 34 3436
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Versa E

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Printing Technology	Scanning laser diode Electrophotography
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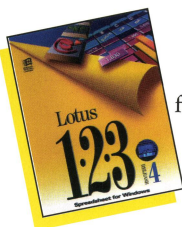
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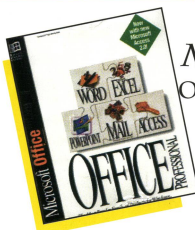
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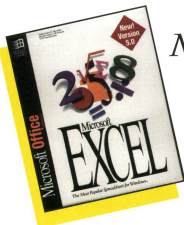
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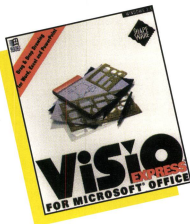
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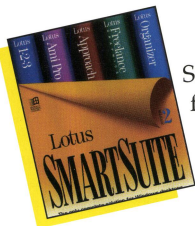
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To install, plug the Data Link modules into the parallel ports of your PCs and printer.

Connect them with the cables supplied. (Eight metres is included for each PC.) That's it! The Data Links are now installed and ready to print from any DOS or WIN application. Cable lengths up to 450 metres. The Data Link's fast 6,250 cps speed (that's 375,000 characters per min ... 180 A4 pages of text) gets your job printing quickly.

Data Link Starter Kits have everything you need for two computers to share one printer. For more computers, just add more Data Link modules. Or combine a Data Link Transmitter and Receiver to make a Data Link Distance Extender ... a parallel cable of up to 450 metres.

\$59 a PC or Printer (\$67 inc tax) ... Starter Kits \$175 (\$199 inc tax)

LESS 10% for 10+ ... or 20% for 20+

\$59
\$67 inc tax

Print Links ... To Share 2-4 Printers

NEW!



From the same stable as the Data Link, the Print Link is a printer sharing system that allows up to 20 PCs to share up to 4 printers. A rotary selector switch comes with each PC module, allowing users to choose the right printer for each job. All printers can operate concurrently, ensuring maximum throughput for all situations.

Each module includes 8 metres of RJ12 telephone cable and installation is as easy as the Data Link ... just plug in the modules, connect them together with the cable and start printing. That's all there is to it!

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The choice of many corporations and government departments, the Protec Byteprint and Byteway ranges provide models from 3 to 24 ports, with virtually any mix of serial and parallel ports you require. Buffers from 256K to 4MB. DOS and WIN software. Call for details.

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Manual switches and low-cost cables



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"...easily the best peer-to-peer network we have used to date" says LAN Magazine (US). "...simple to install and operate, and an ideal peer-to-peer network for DOS and Windows machines" says Your Computer Magazine.

2, 5, 10 and 30-user licence packs. Pairwise \$99 (\$99 inc tax)
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Top
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The **Language Assistant Series** provides bi-directional translation to or from English and French, German, Spanish and Italian. Sentence-by-sentence translation, provides you with understandable translations. Powerful reference tools include grammar help, verb conjugation and bilingual dictionaries (customisable by adding new words or modifying existing ones). DOS & WIN versions avail.

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PRICE WATCH

**IDC estimates that
around 95,000 Pentium
PCs will be sold this year.
But who's offering
the bargains?**

PowerPC, but since Pentiums have been longer in the market the likelihood of finding sufficient price variation to get a good deal is higher.

Since the first Pentium machines appeared in the market in mid last year, IDC estimates that around 3200 have been snapped up. This figure is projected to grow astronomically to around 95,000 this year, and represent a little over 10 per cent of all Intel-based PCs sold in 1994.

PowerPC, by comparison, is marked by its later entry into the market, and is anticipating sales of around 13,000 this calendar year.

The advent of competitive '586' chips from

other manufacturers such as AMD and Cyrix will no doubt drive the price of Pentium machines down, but Intel has nevertheless kept a firm eye on market expectations, dropping its chip price by around 15 per cent a few months ago.

Price Watch found some interesting offerings, and a variety of prices. Cheapest was U-Tech, who offered a 60MHz Pentium with 8M of RAM and 340M of hard drive for \$3500, although software was an additional \$170. Today Tech was very helpful, although charging \$180 for DOS and Windows seemed a bit steep, and was the most expensive of the software options offered. The most expensive unit offered was from AVO computers, where the refreshingly honest Leo said "I won't sell you the cheapest machine because it's not worth cutting corners." Leo proved particularly informative, and readers should bear in mind when looking at the price that it includes a Samtron monitor and SCSI hard drive.

Another of the more expensive machines was available from Harris Systems, where Patrick helpfully informed me that just over \$5000 would buy a 66MHz machine with Mitac monitor and Honeywell keyboard. Software was included in the price.

Our charter and method

Price Watch is an interesting exercise in comparative technologies, relative prices and human nature. All investigations are conducted anonymously, and conversations are annotated. Prices and system capabilities printed here are provided by the sales staff at the offices we contacted, and all information is as supplied. While we assume that these are correct we cannot accept any responsibility for errors or omissions. Neither will we be held to account by companies mentioned here for omissions to product ranges or system capabilities. The responsibility rests with sales staff to provide adequate information, as the company would expect them to do with every customer.

Pentium prices

Dealer	Phone	Best Price	MHz	RAM	Hard Disk	Extras	Warranty	Software
Today Tech	(02) 955 8077	\$4300	60MHz	16M	225 IDE	1M VGA card, 15" NI monitor, keyboard and mouse	2yrs parts, 5yrs labour,	\$180 for DOS & Windows
U-Tech	(02) 953 7788	\$5600 \$3500	60MHz 60MHz	16M 8M	540M 340M	2M #9 PCI VGA card, 15" NI monitor, keyboard and mouse	2yrs parts, 4yrs labour (return to base)	
UTC Top Tech	(02) 977 5702	\$4200	60MHz	8M	340M	1M #9 PCI VGA card, 15" NI monitor, mouse, keyboard	2yrs parts, 5yrs labour (return to base)	\$120 for DOS & Windows
Data Star	(02) 299 5648	\$4040	60MHz	8M	425 IDE	1M No. 9 PCI VGA, Honeywell keyboard, mouse	2yrs parts, 4yrs labour (return to base)	
Acuma Computer	(02) 906 3485	\$3890	60MHz	8M	340M IDE	1M S3 VGA PCI card 15" NI monitor, mouse, keyboard	2yrs parts, 5yrs labour	\$150 for DOS & Windows
		\$4590	60MHz	16M	540M IDE	1M S3 VGA PCI card, 15" NI monitor, mouse, keyboard		
AVO Computers	(02) 906 2655	\$4950	60MHz	8M	340M SCSI	1M S3 VGA PCI card, 15" Samtron monitor, games port, keyboard, mouse	1yr parts, 2yrs labour	\$150 for DOS & Windows
Harris Systems	(02) 957 1142	\$5099	66MHz	8M	210 IDE	1M #9 VGA PCI card, 14" Mitac monitor, Microsoft mouse, 2yrs parts and labour, lifetime tech support	DOS & Windows included	
Compoint Computers	(02) 552 2994	\$3550	60MHz	8M	210 IDE	1M Cirrus Logic VGA VESA card, 14" monitor, keyboard, mouse	5yrs labour, 1yr parts	\$150 for DOS & Windows

Note: all machines were equipped with a single 3.5in drive

BEST
BUYS

It might seem surprising to encounter a retailer who maintains that price is not his major business driver. Yet Stephen Paddon, the founder of Pulsar Technics, is adamant that his success has not been driven by competing on a dollar-for-dollar basis.

The business has evolved over five years, from a backyard business sourcing computers and components for friends, and friends of friends, and then friends of friends of... well, you get the idea. Word of mouth put Pulsar Technics on its feet, and Mr Paddon says that this is still the major source of new business.

When the backyard finally became too small for all the friends' friends, Pulsar Technics moved to a retail outlet in Northgate and last year to more central premises in Melbourne city. The company employs eight full-time and four part-time staff, and Mr Paddon says, this number is growing steadily.

While the company assembles and sells its own badge PCs, selling whole systems is a very small part of the business, Mr Paddon says. "Our customers are characteristically knowledgeable enough about computers and about what they want. They buy the parts they need from us and do it themselves.

"We find that many people out there in the market are on to their second and third computers by now, but these are not necessarily new machines, they are new incarnations, as people upgrade and replace parts rather than just going and buying a new PC." He estimates that 80 per cent of the hardware that Pulsar Technics sells is in parts to people who upgrade or add-on to their systems. The company also has a roaring trade in software, particularly games, and games peripherals. These games peripherals include joysticks developed by a group of ex-Vietnam pilots, and a product called F1 Driving, which is a wheel, gear stick and pedals for use with a formula one racing game. Sales of such items are dramatic, says Mr Paddon. "We have been representing the F1 product for just a few weeks, and we have sold more than 30, at \$295 each, to a whole range of people from Harley Davidson bikies to school kids."

Price is important, he concedes, but it's not the only consideration. "We have evolved, since the move to the city, from a company which dealt on 'price, price,

PULSAR
TECHNICS
FROM BACKYARD
TO NATIONWIDE

BY HELEN DANCER



Pulsar Technics: plans to develop mail order business

price', to a company which focuses on 'service, service, service'. Of course we have to be close enough to the competitor's price to be considered, but ultimately the promise of consistency and good service are more valuable than simply the best price." Pulsar Technics advertises nationally and thus draws customers from all over Australia and beyond, including Papua New Guinea and New Zealand.

It's a heartening response for Mr Paddon, who says that his number one priority is to grow a successful mail order business alongside his existing retail enterprise. "People ask me when we are going to set up stores in other centres. I tell them we don't need to, all we need to do is grow the mail order business. Because of the nature of our customer base, who are people educated about what they want and how to use it, it's far easier for them to simply place an order and have the component sent to them. We have very good phone help service for anyone who needs a little assistance, or

we'll fax technical details where necessary. Those customers who buy the components from us are generally confident and knowledgeable enough that that's all they need. Others who don't have that level of expertise will buy a whole system, in which case we build in a support agreement which can be serviced by an Australia-wide provider."

Online ordering is the next service on the horizon. Pulsar Technics is contemplating the move to

electronic ordering with a move into online access to information about products, and automatic access to technical assistance. "We'll get into online ordering when we can resolve the concerns we have about credit card fraud. It's an issue that everyone who puts themselves in that position should consider carefully, and we take that responsibility seriously."

Company Snapshot

Company name: Pulsar Technics
ACN number: 059 117 172
Phone: (03) 639 1733
Fax: (03) 639 8525
Hotline support: No
Onsite warranty option: Yes
Areas onsite warranty available: Australia
Who provides the maintenance?: Third party
Average delivery time: 3 days (not guaranteed)
Returns policy: 14 days money back, must have invoice/docket

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AT IO Card 2 Serial, 1 Parallel, 1 Game,
IDE Controller, 101 Key Keyboard
AT Style Floppy Case Or Mini Tower With 200W Power Supply
3 Button Mouse

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VLB IDE Controller, Honeywell 101 Key Keyboard
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486-DX 33	\$ 1800	\$ 2700
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PENTIUM-60	\$ 3900	\$ 3900

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DOOM

HAS ARRIVED



The game of 1994 has arrived! DOOM, from ID Software is sure to become the hottest new game in 1994. Produced by the same guys who brought you Wolfenstein 3D, this game can only be described as awesome. Taking full advantage of the power inherent in the latest technology PCs this program will blow you out of the air with its realistic 3D perspective, smooth animation, and great digitized sound. If you have a 386SX or greater processor, 4 megabytes of RAM, and a VGA or Super VGA graphics system, then DOOM is a must. But beware, if you are squeamish, and don't like realistic depictions of violence, then this game is not for you.

You play the role of an off duty soldiers who suddenly finds himself thrown into the middle of an inter dimensional war. Wave after wave of demonic creatures have invaded the base, and your job is to get rid off them. However your enemies come in all types and sizes, and they make it awfully hard for you to do your job. They range from demon troops, covered with spikes, who shoot fireballs at you with great accuracy. There are also the demon sergeants who bite with great ferocity, all the way up to the demon skulls which float above the surface and literally blast you with their glare, and the ultimate challenge, the huge boss demon that will really make your day a hell!

Throughout all this you are equipped with a range of armaments ranging from your fist, which isn't all that handy against the demon enemy, to the incredibly devastating BFG9000. Between these two you can use a pistol, a shotgun, a chain gun, a rocket launcher, and a pulse gun. Of course it is up to you to find all but the basic weapons, just to add to the challenge.

ID Software has been developing DOOM for the last 18 months. In it they have spared no detail to make this the most amazing new game to hit the PC scene. Pre release sales worldwide have guaranteed this program will be one of the hottest games of 1994. It is now available in Australia from BUDGETWARE for the special price of only \$59 with free postage and handling. Order your copy of DOOM now and experience the terror and excitement of this hot new game!

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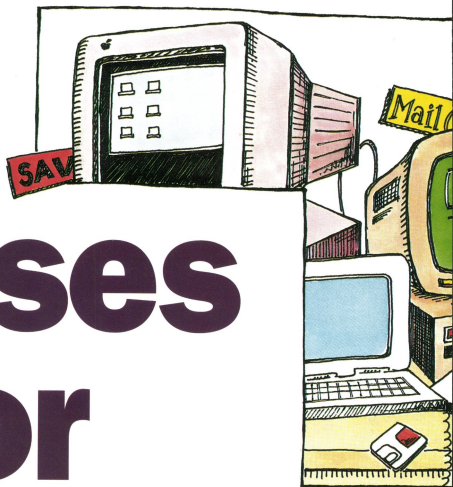
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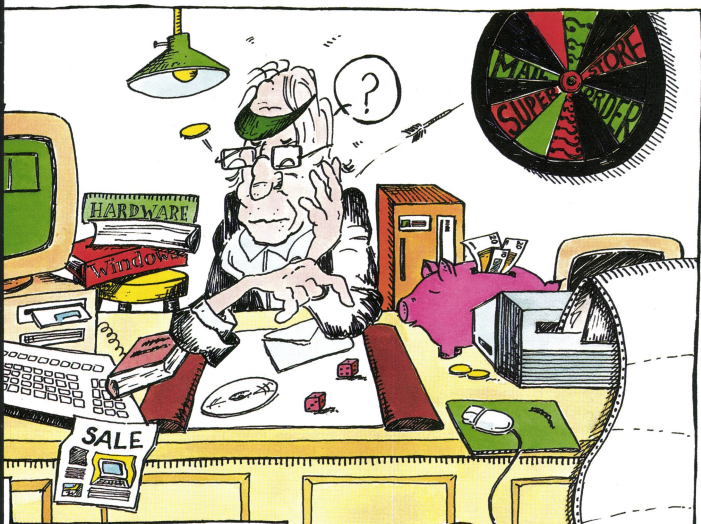
PSR 0794



Horses for courses

Buying a PC is no longer a one horse race. Alongside the traditional PC dealerships, there is a wide range of alternatives. You can buy a PC from a store that sells any number of electronic or white goods, you can pick up the phone and order a whole PC or just the parts out of a catalogue, or you can let someone else make the choice for you — at a price, of course.

What do get for your money in each case? How can you be assured that the advise and help you get after you buy will match the promises they made before you signed on the dotted line?



By Helen Dancer

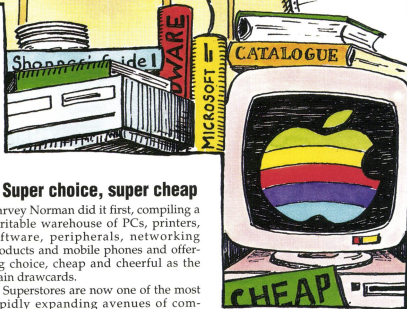
Ubiquitous is a word we're hearing a lot of these days, usually referring to the information superhighway and the easier access to information that it will bring. But you could just as easily describe the average person's access to computers as ubiquitous as well. Short of being able to buy them on street corners, the avenues for purchasing a PC are apparently endless.

Superstores, mail-order houses, OEMs, ISVs, the traditional dealer channel—the list of options is as confusing as the range of PCs themselves. But what guarantees can you expect when you trust your money to the hands of all these operators? Which horse should you back in the race for better technology?

Super choice, super cheap

Harvey Norman did it first, compiling a veritable warehouse of PCs, printers, software, peripherals, networking products and mobile phones and offering choice, cheap and cheerful as the main drawcards.

Superstores are now one of the most rapidly expanding avenues of computer purchase. Every store with more than three kinds of computers is rushing to jump on the bandwagon and call itself 'super'.



SHOPPER'S GUIDE

But the successful Harvey Norman formula is founded on more than large spaces and wide choices. There's a fundamental recognition that there's a desire for walk in/walk out simplicity in purchasing, a demand that its range and storage capacity can offer.

"Choice is a big objective, but when people come to Harvey Norman, it is because they know they can find what they want, that it will be in stock, and they can walk out with it, not have to be put on a back order list, and have to come back, say in three weeks' time to pick it up," said Geoff Van Der Vegt, at Harvey Norman's Auburn superstore.

He lists 16 kinds of notebook computers, from nine different manufacturers, between 25 and 30 desktop configurations, around 50 different printers and literally hundreds of software packages as the kind of choice the store offers.

"We're also competitive on price, we constantly survey prices around town, and we consistently measure up well. We're fair with pricing too. If someone comes to us with a catalogue from a competitor and says 'Look, I can get that system for this much', we'll match that price," Mr Van Der Vegt said.

"Our corporate customers use us as a warehouse, and a place to outsource. They know that whatever they want, we'll have it in stock, so that's our big attraction for them. Also, we have a service department, both in the stores and which customers can use in house. Outsourcing networking and other tasks is becoming an increasing part of our business for these customers, as they are just not doing it for themselves anymore."

The right advice

Outsourcing is the area where the edges blur between organisations such as Harvey Norman and more traditional service providers like Somerset Systems.

Somerset's Chris Stockton describes his organisation as an ISV — an independent

software vendor — emphasising that the company's mission is not to sell other vendors' hardware, but to put together the right deal for each particular customer.

"The farthest we go is in assisting procurement, and negotiating for the customer. We don't get in the middle of the invoicing process, that's between the client and the provider." The company is confident enough in its expertise as a software value adder and systems consultant that it doesn't need to take a portion of the purchase price, Mr Stockton says. "We don't resell, we value add. Our strengths are our independence, and an independent view. Our clients are typically those companies which need a system to fit a specific need, but don't have the personnel time to go out and research the market and choose the right product. Leaving the job to us means that they can

might have had, if he had not been compelled to spend that week evaluating systems, acting as a purchasing officer?"

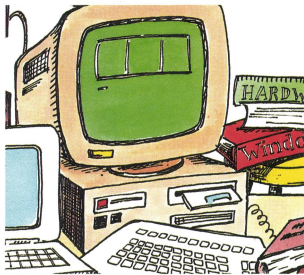
The channel still flows

The rise of alternatives might give the impression that the traditional dealer is a dying breed. Not so, as companies such as Harris Technology prove. In fact, according to the store's owner Ron Harris, it's still a dealer's door the customer walks through when he wants to be taken seriously. Harris' staff are characterised more by a knowledge of what they're talking about than for flash red matching shirts, he jibes, and from heavy-duty customers to first-time buyers, customers trust the dealer channel not to give them a bum steer.

Mr Harris describes his store as a superstore without games, a focus on business needs, and expertise in higher end packages such as DTP, RAID systems, CAD/CAM, and corporate requirements such as networking. "At first glance we may seem similar. We have a lot of different systems on offer, from all the major brands, as well as our own Epoch Systems. It's like a traditional dealer approach with a superstore look," he said.

"But we offer real choice, rather than a number of put-together systems for a certain price, which is the sort of thing the superstores specialise in. When a person buys a system from us, he designs it, we don't tell him well, with that monitor you have to have such and such a hard drive and so much memory. We can configure a system to fit the requirements of the individual customer." Harris customers will find that the sales people they deal with wear suits, have desks, know what they are talking about and have more than a fleeting minute to spend with each customer, Mr Harris asserts. "They are not floor walkers who point to the right aisle and keep on going," he said. "They tend to ask a lot more questions about the use of the system, and the person's requirements, to build a picture of a PC that's going to best suit that person." It's the sort of approach that generates \$2 million a month for the store, and has seen repeat business from home buyers and large corporates alike. Large PC consumers such as CSIRO, Sydney University and Ampolex keep coming back, says Mr Harris. The drawcard is reliable systems and expert advice on networking and other systems administration issues.

And the issue of cost is a furphy, he maintains. "Our customers buy from us at a very competitive price — 95 per cent of the time we match even the pricing set by the superstores. Buying a computer from us means not only value for money in the



get on and concentrate on running their own businesses. When you think of it, having a senior person in your IT department acting as purchasing officer doesn't make a lot of sense. When they hand over the responsibility to us, the IT staff can get on with the real job of servicing the internal organisation," he said.

Doing business through an ISV such as Somerset invariably saves the client money, Mr Stockton asserts. "The costs we save are varied, and sometimes intangible," he said. "Primarily there's the cost of the staff hours saved, and the opportunity to get on with pressing organisational tasks. Also, there's the fact that most often we will negotiate a better price on the system itself or, in the final analysis, have chosen a system which works more efficiently and is therefore essentially more cost effective. Thirdly, and more intangibly, there's what we call the cost of lost opportunity. How can you place a value on the opportunity that a person

purchase price, but the added value of specific consulting on particular areas of computing. Our customers are typified by the one example of a fellow who came in because he had been around looking for a PC and had been dissatisfied with the calibre of information and advice he had been getting. He talked to one of our consultants, got the answers he had been looking for, and bought a PC. The whole transaction took less than 17 minutes."

City to the bush, over the phone, overnight

If there's any truth to the proposition that there's strength in numbers, then Buytech must be onto a good thing, and catalogue buying is the way of the future.

The company is currently cutting down its sizeable catalogue, in the process designing something it can deliver to its 20,000-strong mailing list more frequently. That's a sign of the times, according to Bruce Ind, the venture's new managing partner. "Already there are such a lot of items on that catalogue that have dropped off, or at least fallen in price. We really want to make available a listing that's more relevant." Shorter shelf life of product details means that the catalogue has to be smaller and more frequent, he says.

Software is the biggest victim of price cutting, with product suites and office software being dramatically reduced. Other items such as multimedia kits and fax modems have seen a fall in price but a rise in quality, due to both increased demand and availability.

Current reliable information is the key component to success in this segment of the PC and related products market, because of the nature of the customer.

Direct buy, catalogue and phone order customers, he asserts, know what they are buying, are more confident of being able to install, tinker and fix, and are looking for a particular product, more likely a component than a whole system, at the best possible price.

"We are dealing with a different type of customer from conventional stores," Mr Ind said. "People who buy from us will have researched what they want, and will shop from the catalogue because they can see it's cheaper." The business doesn't have, for example, the burden of overheads, and

Making PCs remotely possible

Buying a PC or a whole suite of them is fine if you have one office to which you need them delivered. But ordering PCs for offices and sites all over the country is a different matter entirely, and calls for a very good relationship with the supplier.

Ord Minnett's purchasing officer Fiona Smith has placed her trust in Buytech, and has never been disappointed. Her company buys hubs, software, a range of applications and LAN Manager products from Microsoft, and printers for four offices around the country, all by phone. "Our requirements are timeliness in delivery and competitive price. Buytech has always been competitive in price, and they are sensitive to our particular needs as a customer," she said.

"We don't use the catalogue so much. I tend to ring up and tell them, 'these are our requirements, can you deliver?' Most often they can, and we receive the goods the next day. If not, they are very honest with us, and never say they can deliver something they can't." Track record is also important to CSIRO, which is con-

strained and governed in its purchasing patterns by government contract or the PE 50. CSIRO's Wildlife and Ecology Division in Canberra has used Harris Technology consistently, if not exclusively, to supply equipment not only for the Canberra office but also to sites as far-flung as Darwin.

"Our criteria are quality, price and a certain level of support and service. Our contracts for equipment go to the provider that can demonstrate the best mix of these three for the particular equipment and situation of the contract," says the department's media spokesperson Robyn Turner.

"The department has sourced a great deal of equipment from Harris Technology over the past three years, which indicates that they have come up with what we needed most often. A key factor is the company's flexibility and the fact that they are available at the end of the phone. Also, they have a record of satisfactory service and support. In fact the PC on my desk came from Harris Technology."

can pass these cost savings on to the customer.

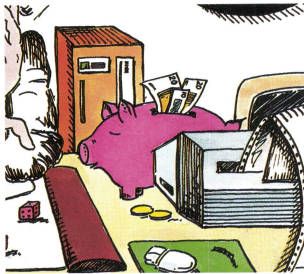
The variety of items requested isn't confined to what's in the catalogue either, he says. People seem to use the variety of items on offer as a signpost that they can

the tricky bits, things you'd never go to a superstore for, because they all organise their purchasing a long time in advance, and are locked into what they can supply and what they can't." All warranties on products bought through mail order are with the original vendor, although Buytech can organise warranties on systems for customers either in central or remote locations.

"We have an arrangement with a company called Australia-Wide Warranties, which we can organise for our customers for an extra \$90 a year, which will guarantee to meet their service and support requirements in person." Whether over the phone, over the desk or behind a trolley, direct buying is easier than it ever has been, and the pressure on the industry means that prices are falling too. Spending the same amount of money will return better value in the equipment you can purchase, and there doesn't seem to be any evidence to suggest that that's a short-term scenario.

Degrees of confidence in what you want therefore, dictate which of these avenues is right for you, and a little window shopping never did any harm, especially when you consider that the product you end up with is going to become an integral part of your working or recreational life.

No one option is unreservedly the best, but there's bound to be a best for you out there somewhere. ▲



get anything they need. This means that the catalogue is just a starting point, and Buytech trades in a lot of one-off and unadvertised items.

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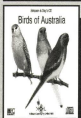
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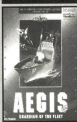
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lation procedures. But adding multimedia capabilities is one of the most important upgrades you'll ever make, because it opens your computer to the new world of video, sound, and diverse multimedia software.

Luckily, there is hope. There is one viable way to spare hours spent rummaging through boxes and manuals for IRQ settings, and racking up time on tech-support lines: the multimedia upgrade kit.

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each component is well-matched. Also, kits give you the extras you need: cables, integrated installation software, and often extensive bonus CD-ROM libraries. Best of all, quality multimedia kits are now available by mail for less than \$500, giving you much better value than if you were to

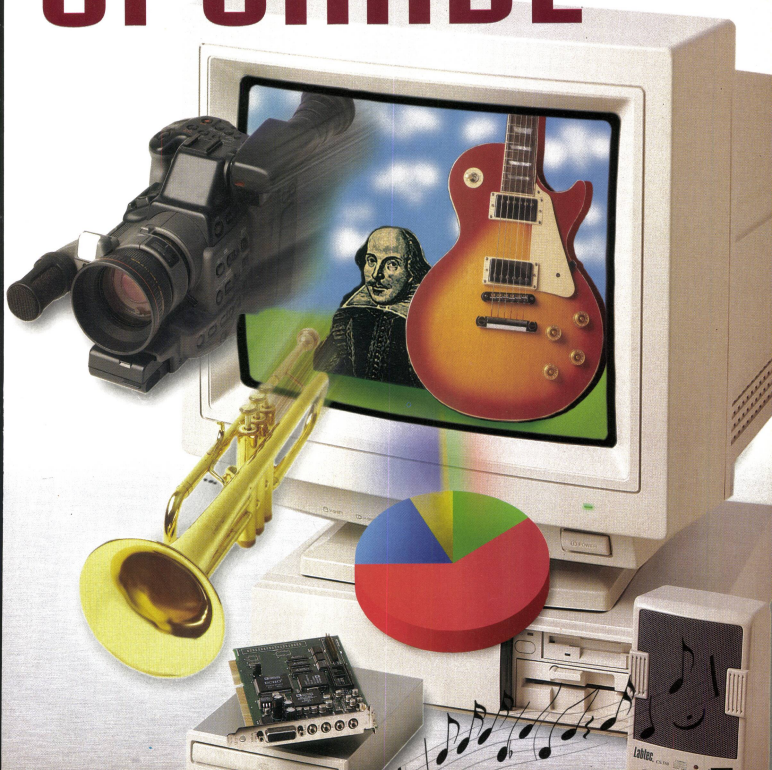
buy the components separately.

To assess the value of these new low-cost multimedia kits, *Computer Shopper* set up a mail-order price limit of \$500

BY STEVEN C.M. CHEN



UPGRADE



SHOPPER'S GUIDE

Live entertainment

First question? Does your TV need separate speakers plugged in for you to hear anything? Of course not; neither should your PC. Both Philips and Amstrad have produced neat integrated solutions that provide one unit which sits on top of the PC case, and directs sweet stereo at you either side of the image onscreen. This solution gets round the extra wires/boxes problem, and also eradicates those annoying colour washes which poorly shielded external speakers can give to your screen image.

Monolithic multimedia indeed

The next sensible adjunct to your multimedia-capable PC is likely to be some form of communication device. After all, 'media' is usually taken to be some form of information transmission from one person to another. And while it is true that sound and moving graphics are useful adjuncts to displayed text, it is not really doing an awful lot of transmission in the process. The logical extension to most existing systems would seem to be radio or TV built in. And surprise,

surprise, this technology is already available.

Hauppaug WinTV and Wiz-Tech MicroTV both fit neatly into a standard 16-bit slot, plug into your aerial on the roof and the existing monitor to provide truly stunning *Man O' Man* in a Window while you sweat over a spreadsheet. Brilliant. Or, if you are more conservative, the *7.30 Report* and the news. All TV screens behave exactly the same as any Windows window; if you like the look of an advert, simply grab the window and take the address or phone details down later. Full software control can keep you in touch with exactly what is happening around the world, changing channel and display parameters at the click of a finger.

But the real beauty of these units is that they accept teletext transmissions as well as simple movie output. So users can check out the weather, the stock market or the holiday flights available equally easily. The WinTV software can also grab teletext information and download it as an ASCII file — the uses of that facility are simply too big to comprehend at first look, but have enormous potential for travel agents, investors, dealers and so on.

Radio does not seem to have caught on in the same way, but Acer had plans to market radio on a sound card in an upgrade kit. For those who need to keep

in touch with results or news, it's a wonderful accessory.

On the subject of touch, multimedia should not be considered to be a one-way street, with streams of information rushing out and overpowering your every sense. Hewlett-Packard tried unsuccessfully to convince the world that the mouse was pointless; the ideal point was



FlexCam integrates a tiny CCD camera and microphone

Big pick CD-ROM titles

A shopper's guide to the top CD-ROMs to get you going.

BY MICHAEL AITKEN

Your CD drive door is open, and you want to take it for a spin. You've checked out the CDs that were bundled for free with the upgrade kit — but somehow the text database of whale songs didn't hold your attention. So where to now?

PC Super Market went shopping for the top multimedia offerings on MPC CD-ROM.

There are more new CD-ROM titles coming onto the market each month, as more computer users buy machines that have CD-ROM drives and the power to run the applications. As well as titles from specialist game publishers and many small outfits, industry giant Microsoft is pushing out titles under its Home banner.

American interests and accents still dominate the catalogues, but we are also seeing a welcome upsurge in Australian production. Firmware's Long Time, Olden Time (a

Mac CD, not yet available for PCs) applies the technology to communicate Aboriginal culture.

Reference CDs

- Microsoft Encarta 1994. A good general purpose encyclopedia, especially suited to school-age researchers. Cut and paste can do wonders for assignments (attributed, of course!). It includes a number of animations, and plenty of sound and still pictures. The design makes it easy to navigate. Compton's and Grolier's encyclopedias also compete for the reference dollar.
- Microsoft Bookshelf 1993. A collection of small reference works, this CD contains a dictionary, thesaurus, quotations (hear JFK), and a pocket atlas and encyclopedia. While the recommended price seems steep, it's a handy reference disk. It serves well as the CD that lives in the drive.

To page 43

your finger. But its touch-screen series of monitors never really caught on as well as they could have despite a very intuitive action. However, if you really want to keep in touch with your multimedia system, there are still one or two manufacturers who market touch-screen technology (see Box Two). Or if you prefer your touch media to be full-grip stuff, the **CyberMan** is the only thing for you. The latest offering from input specialists Logitech, Cyberman is not just a three-dimensional joystick. It incorporates feedback. Battery powered, it lurches back at you when a digital opponent kicks you or tries to skewer you with a laser sword.

But if your vision of multimedia runs outside the gamut of wobbly things in the palm of your hand, why not consider voice control? Would you like to tell that TV in the corner of the screen to change channel? Just load **Creative's VoiceAssist** or the slightly less-capable **DragonTalk** software from MediaVision, plug in the microphone and you can get Channel Seven at the drop of a larynx.

On a truly integrated machine, you could use voice control to tell the machine to pick up the phone, dial, and then have a chat to the Alan Jones feedback line (assuming you were using something like Lotus Organiser, and assuming Alan Jones makes a comeback). All without touching the keyboard. Microphones are now available (such as the excellent units that Compaq supplies) in tiny, directional stick-on form to pop on top of your

Interactive reflections

What we wanted to do was take the kind of liner notes that you used to find on old Jazz albums, where you used to learn about the songs themselves, and expand that into an interactive video form." That's Mike Fronzeck, creative director of Pacific Advanced Media in Crow's Nest on Sydney's Northshore, explaining how the company approached its 1993 project, *Pools of Reflection*.

Basically an album by Australian musician Guy Delandro, the CD release of *Pools* featured the talents of Pacific Media in the form of a CD-ROM section included on the disk. PC CD-ROM owners could see an Apple QuickTime presentation, including details about the album, performers and individual tracks keyed to relevant samples of the music, plus video clips of the musicians explaining their work. As well as being a bonus for music fans who owned a CD-ROM, the Interactive Notes has obvious point-of-sale value: "We made it compatible with a kiosk format," said Mike, "so that if you don't interact with it for a while it chooses a track at random and talks about that, so it could be used in record stores to promote the album."

Pacific Advanced Media Studio was founded in 1992 as an integrated production house for digital media works. Like many of the small, independent companies operating in the multimedia area, its members have a varied background, combining experience in marketing, media law, authoring, sound and video production as well as formal programming.

Another one of the projects Pacific Media has been involved in is a virtual trade show on CD-ROM. Xpand Xpo allows the armchair attendee to browse through the booths via a 3D photo-realistic colour display. At a chosen exhibition stand simply double-click on the demo station to view a product movie, which comes as a 60 second voice-narrated introduction to the product. Sales literature can then be viewed, and then the product can be dragged-and-dropped into a virtual show bag. "When you quit out of this," said Mike, "it takes everything in your show bag and copies it onto your hard disk, including the demo software, so you can run those demos." Updating the virtual show is fairly straightforward. "You can turn it around and update it very quickly, by rendering the new stalls in and adding the new information and exhibitors."

Is there anything the virtual trade show doesn't have? "Aching feet," Mike grins, "oh, and a snack bar."

Nat Tunbridge

From page 42

- **Mayo Clinic: Family Health Book.** While the Mayo advisers won't have you removing your appendix on the kitchen table, this CD is an excellent medical resource. It talks about maintaining good health, anatomy, typical health problems and issues, and covers basic diagnosis. This is done with text sections (hot-linked, like Windows help) and a wealth of illustrations (including human bites and brain tumors), some of them animated.
- **The Complete Margaret Fulton Cookbook for Windows** lets you scale recipes, choose measurement units, and do complex searches for that elusive dish. This title will come into its own when Microsoft puts a Windows for Families interface into every fridge.
- **Coffee table CDs**
 - **Birds of Australia.** For birdos, this CD brings you Simpson and Day's *Birds of Australia*, with details of 793 Australian birds, and 400 bird song recordings. With maps of habitats, and plenty of information on the birds, this is an excellent resource. All you need is a notebook with a CD-ROM to take bird-watching.
 - **Cinemania.** One of the charms of good CD titles is easy access to masses of data. And this fits so well with



The multimedia Pioneer DRM-604X CD-ROM Minichanger

movies — you look up a film, jump to the actor, and on to another film, and so on. Plenty of stills, sound grabs, and some movie excerpts. You can build your own lists, and disagree with a clutch of critics. No movie buff should be without it.

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SHOPPER'S GUIDE

Get the fax

monitor. Add a microphone and you can embed voice notes into email or to disks as long as they play back through a similar system.

Both IBM and Creative are also marketing first generation speech synthesis software, so if you want to listen to a story (albeit a fairly basic one) then the technology does exist to let your PC do the talking. On a more practical level, **Monologue** software from First Byte (bundled free with many sound cards) gives a spoken check of numerical input values. This is ideal if you input lots of numeric data and want confirmation the audio way.

To further enhance your input into the system, why not look at a camera? Sure, you will need a video board to connect it into, but think what fun you could have pulling faces at yourself on screen when you lose interest in the work you were doing. VideoLabs supplies a very neat unit called the **FlexCam** which integrates a tiny CCD camera and a microphone; the ideal desktop input device. Using something like this, you could send images across a network, update your Starlog like Captain Kirk, or even check out how you look to the person across the other end of the network.

The other ubiquitous media dissemination channel used to powerful effect by many marketing organisations is the fax. Say you built a fax card into your PC so you could accept fax transmissions and email. Nothing new there. But say you added to that a fax-modem capability to differentiate between fax, data and voice transmission automatically. Then you linked the smart modem device to software that answered every call — no matter what kind — and stored it on the PC's hard disk for you to access later, or from a remote location? Sounding good, and definitely 'multimediate'.

Then, suppose you get really clever and you built in keypad-driven fax polling and voice directed menu selection and PABX control. The joy of this is that any PC then becomes instantly converted to a fully chainable marketing tool which the sysop only need access when convenient. All this technology is now readily available in slightly different forms from companies like NetComm with its **Cooee Electronic Secretary**, Interlink with **Voidax** and Microfax with its eponymous product. Join these capabilities to Microsoft's Fax-Mail systems and the system starts to look really good.

But let's face it, not everybody wants to become the completely automated multimedia PC operator. Many of us simply want to make pretty things that look and sound good on the desktop. The ideal toy

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for users like this would be the video capture card (see 'Reel to real' APC June 94 for more on this topic.) Most of these come with Video for Windows and allow a variety of sources such as tuners VCRs, cameras or still digital cameras to input images for manipulation and redisplaying on your VGA monitor.

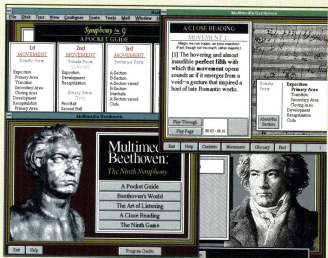
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■ **Microsoft composer series.** **Microsoft's Beethoven:** the Ninth Symphony has been followed up with close-ups of works by Stravinsky, Mozart and Schubert. These disks talk about the composer, his life and times, and analyse the composition, section by section. They can also be played as audio CDs. These titles offer an unbeatable way to study the works.

■ **Hard Day's Night** is an annotated version of the classic Beatles film. You can move around at will, and read about the movie and the songs. While it has much to offer to the Fab Four's fans, be warned that the production values have been compromised by the storage limits of the CD medium... the video is grainy, runs in a small window, and the sound is not music CD quality.

CDs for kids

■ **Playtime in the Park** is an excellent CD-ROM for ages three and up. You join a bear family messing around in the park. Much of the scenery is live — frogs jump when you click them, bears crunch their apples. There's speech, sound effects, songs and heaps of activities. Voices come in Australian, US English, and Japanese.



All about Beethoven and his Ninth Symphony

■ **A Silly Noisy House**, also for ages three and up, puts you in a dolls house full of, well, silly noisy things. As with Playtime, the screen is live — clicks lead to sounds and animations. The fun is in exploring the

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SHOPPER'S GUIDE

Linking the media

Most allow the input and mixing of several video sources, and many also allow you to put titles over the top too. Now you really are into multimedia with full cinema-style productions on your PC a reality. The quality may not give Steven Spielberg sleepless nights, but you really can make your own videos. If you don't have the luxury of your own ^{^^}CD WORM drive to store all that video data, you could try fitting an MPEG (motion picture experts group) compression board to compress and decompress your video in real time. The VideoMaker MPEG card manages to squeeze 45 secs of live video onto a standard floppy — impressive or what!

If you don't want to make your own feature films (they do take up rather a lot of disk space) then why not trying viewing some by using the ReelMagic MPEG card (see First Looks review, May 1994 APC, page 30). This allows you to play standard CDs through your system, but thanks to the compression of something around 100:1, you can get around 2.5 hours of full motion video and accompanying audio as well. As yet there are not heaps of titles available, but the number will increase over the next few months according to the vendors.

If you already have all the gadgets previously mentioned, but would like to share your wonderful images and sounds with more people, you could possibly benefit from a projection panel. These plug into the video outlet of your video or graphics card, and when put on top of an OHP projector, allow wall-sized images to be shown simply and relatively cheaply. Units are produced by Sharp, Polaroid and Kodak. Of course, if you need to match the sound to the images, then try linking the output from your sound card into the hi-fi to give the best results.

If you are not into size, but quantity is your thing, then consider NTV (network TV). This software product allows multi-bit equipped network workstations to swap audio, video and data across any number of users on standard Ethernet or Token Ring network. Although the system is limited to four concurrent active users to give any realistic speed of operation, the makers say they will have a system for use over standard PSTN phone lines in the near future.

What next?

Thanks to one of the most rapidly expanding markets in the PC industry, the multimedia inventors are hard at it in their garrets churning out yet more amazing gadgets to enhance your links to the digital experience.

Although the games world seems to

have cornered the market in optical fibre equipped gloves which sense movement and actions of the wearer, AutoDesk has been trying such a system out for use with its Virtual Reality packages. Point, you go in that direction. Pick up the item you are looking at and more information is shown onscreen. Turn the knob and push and the door opens. Virtual multimedia; perhaps the next step is to smell something virtual wafting through the newly-opened digidoor. Ideal for architectural walk-throughs, new car ergonomics testing and a host of other applications.

Arcade game junkies will have already experienced the next step in realism, the sensuround system. Although difficult to bring to the home scenario, arcade games already have linked seats and game displays that throw the driver/pilot around in a very realistic simulation of the gravitational (and explosive) effects expected. In the home, however, expect to see Dolby ProLogic type technology in sound cards really soon. This will enable multi-speaker, very low bass and acoustic manipulation of soundtracks and speech that will make games even more addictive than ever.

The next generation of games will also include limited voice input commands, enabled by parallel input/output DSP chip sound cards. As well, instead of merely playing against boring computerised targets that you can eventually learn your way around and outwit, new games like MechWarriors II will be coming out with built in comms capability to

From page 44

house. There's also a song book. The accent is American.

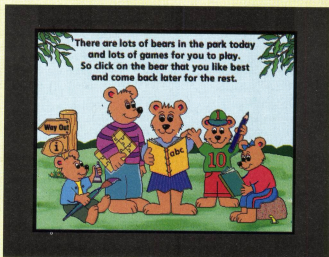
- **Arthur's Teacher Trouble**, for ages 6 to 10 puts you in the shoes of third-grader Arthur. He has to cope with his teacher Mr Ratburn, and compete in the school's spelling bee. Luckily, friends are on hand to help with his quest.

Mainstream software on CD

- Some popular office applications have appeared on CD. The CD format lets publishers add lots of software extras. The multimedia editions of Lotus 1-2-3 4.0 and Microsoft Works are two leading candidates. Both feature rich online tutorials, designed to introduce the package and help you get the most from it. This can save money otherwise spent on training courses. These additional features are of particular value to people who are starting out and have never seen a database, spreadsheet or Window before. The Lotus 1-2-3 CD also includes several Lotus multimedia tools — a 'screen camera' for recording sounds and screens, a book viewer for reading the 1-2-3 manuals, and a media player.

Games

CD-ROM has been used to re-release many disk-based



Playtime in the Park: A live screen lets you play with the bears

games, boosting the production values to use that extra disk space. We've also seen a new breed of games, designed specifically for CD, such as Seventh Guest, Myst, and The JourneyMan Project.

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SHOPPER'S GUIDE

allow players to call up the opposition. Then blast hell out of real opponents across the phone line.

And in the near future, expect to see the kind of helmet-mounted displays restricted to Navy Seal-type movies. Some games are already being supplied with 3D goggles; the use of stereo LCD displays in a special frame is probably not too far away.

But whatever the next big leap of simulated sight, sound, touch, smell or feel the boffins come up with, remember multimedia is just that — media. There still needs to be someone on the other end. At the moment at least. "What did you say, Hal? Why can't you open the door, Hal? Hal, stop spinning my chair round and round like that, you know it makes me dizzy..." ▲



Real wild media

When it comes to hands on multimedia, there has probably been more hands on Simon Ledley's work than anyone else's these past months. Simon, audio engineer at Trackdown Studios in Camperdown in Sydney's inner west, worked with programmer and multimedia guru Simon Lloyd, and designed two of the multimedia installations at the Real Wild Child exhibition currently running at the Powerhouse Museum in Sydney. One of the pieces, called the Interactive Sequencer, takes the form of a touchscreen mounted above six coloured paddles. By touching icons on the screen, users choose a style of music, which then begins playing in a loop. Then they can choose drum, bass and keyboard patterns to form a rhythm track. Their selections alter the soundtrack in real-time, so that the aspiring muso can immediately hear what a particular combination sounds like.

"We wanted to demonstrate how music sequencing works, but in such a way that the general public could walk in and use the exhibit, get a feel for the underlying technology behind sequencers, and also have some fun," Simon said.

Once a rhythm track has been decided on, the user can play different samples over it by striking the paddles. The samples alter for each style of music: under the 'Rock' section, there were lead guitar breaks, crowd noises and shouts; in the 'Reggae' style, toasting, bass fills and percussion.

Although the exhibit is very easy to use, Simon made the

point that a payoff had been made in terms of power to ensure a simple interface.

"It's amazing how much technology we had to use to make it incredibly simple," he said. "A great example is the Macintosh. When the Mac first came out it had a very powerful chip and computer system with tons of system software to make it very easy to use. We discovered that same kind of tradeoff in our own way." The serious hardware and software backing up the Interactive Sequencer included a Quadra 650, CD-ROM, Sample Cell Bus card, Opcode's Max MIDI programming language and MacroMind Director.

Simon is aware of the buzzword status still directed at multimedia from some quarters, but suggested that its rate of expansion would soon silence critics and, as use of CD-ROMs expand, further diversification would occur in the industry, particularly in terms of who does what.

"We're actually starting to find that people are contacting us and asking us to do the audio for our multimedia work," Simon said. "It's becoming like doing a film. There's an art department to handle the graphic side, a programming department to fit the elements together, a sound department to handle all the sound, with maybe even a separate section to sample all the visuals in. The whole way that multimedia seems to be going is towards specialisation."

Nat Tunbridge

Orchid Vidiola video capture card

The Orchid Vidiola is a quarter-length card that the company claims will provide the complete video capture and graphics overlay solution. Installation was very easy — little more than plug in and go. Luckily, the default IRQ, base address, clock termination, wait state and cycle delay defaults were fine. The alternative is messing around with a bewildering array of 22 sets of jumpers.

Installing the supplied setup software was straightforward, as was the supplied Adobe Premiere and Compel PE multimedia authoring packages. So far so good. The system we used already had Video for Windows loaded, which ran the card satisfactorily; if you do not have WinVid you will need to use Premiere for all the video capture and editing, which may not be as cross-platform convenient as Video for Windows.

Once running, the included 'SuperZoom' proprietary technique for running full-screen .VLV files (Orchid's own format) seemed to work well, cutting jerks down noticeably. Input is via an S-video mini DIN socket, or RGB composite. The manual is terse but effective, and the graphics overlay worked in all the modes we tested. A reasonable performer from Orchid.

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In short: Good entry level capture card, but Video for Windows would be useful in addition.

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 Nec Portable Cd- Unit Only: Cdu25, Sesi \$399

Each of above require separate controller.

NEC CD- OPTIONS

Nec Interface Kit Cd-: Xi/At Cdu \$143
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BUYER'S PROTECTION SCHEME

BUY WITH CONFIDENCE

Buying direct from magazine advertisers is becoming an increasingly popular way to purchase PC hardware and software. PC SuperMarket has been launched to provide a one-stop guide to the best products currently available at the best prices.

To protect our readers, we back all adverts appearing in PC SuperMarket with our 'Buyer's Protection Scheme'. The Scheme offers two great benefits:

1. The Payment Protection Plan — Where a supplier goes into liquidation after receiving your order and full payment, but before actually supplying the goods, we will reimburse to you the amount you have paid to the supplier in

respect of that particular order; provided your order has been registered with us.

2. The Problem Clinic — If you encounter any problem with a product purchased through the Scheme within 12 months of the product order being registered with us (see below), and the supplier won't put things right, we will liaise with the supplier on your behalf to try to sort the problem out. This benefit is non-transferable and applies to the original registered purchaser only.

The Scheme applies to all orders placed with suppliers in direct response to an advertisement in PC SuperMarket. To register a purchase with the Scheme, simply order goods from the supplier in

the normal way and then complete the PC SuperMarket Registration Form on Page 62. Give your personal details along with details of the purchase you wish to register. Post the form along with a self-addressed stamped envelope to us within seven days of ordering. The Scheme only protects orders placed within the cover month in which the advertisement for the specific product appeared (for example, the valid period for the July issue is until July 31).

What protection do you get?

The Payment Protection Plan

ACP Publishing Pty Ltd limits its responsibility under the Payment Protection Plan to:

- (a) a maximum of \$10,000 total payments to a registered party in respect of each advertiser;
- (b) an aggregate maximum of \$100,000 total payments in respect of all claims by a registered party during any year commencing July 1.

The Problem Clinic

If you encounter problems with a product, within 12 months of registration with us, we ask that you first give the supplier the opportunity to put things right. If you fail to get satisfaction from the supplier, the Problem Clinic will liaise with the supplier to try and resolve your problem. We cannot, however, give product support relevant to specific products. If you need assistance with a delivery problem, before contacting us please allow 28 days from the date on which you place your order to allow advertisers to cope with fluctuations in demand.

Claiming under the Scheme

(i) Before providing the benefits of the Scheme, we will require proof of full payment by you to the supplier.

(ii) Payment under the Payment Protection Plan will only be made after other liable parties (such as insurance and credit card companies) have met their liability to you in full.

(iii) Claims under the Payment Protection Plan must be made in writing in the prescribed form (available on request). Claims will only be met where the appropriate claims form is lodged with us within 30 days of the liquidation of the supplier. Claims forms must be sent or delivered to GPO Box 37, Sydney NSW 2001.

(iv) Payment under the Payment Protection Plan will not be made if the claimant is found to have an association or relationship with the advertiser or its directors who are the subject of the claim.

Ambit of the Scheme

PC SuperMarket's Buyers Protection Scheme is available only to parties resident or carrying on business in Australia.

Recovery by ACP Publishing Pty Ltd

ACP Publishing Pty Ltd reserves the right to seek recovery from a liquidated supplier of any sums paid to you under the Payment Protection Plan. All we ask is that you give us your full co-operation, including executing any formal documentation required.

Before Buying

1 Use the PC SuperMarket Buyer's Template (see page 64 of last month's issue) when ordering. This will ensure that both you and the supplier have all the information needed.

To Register

1 Fill out the PC SuperMarket Buyer's Protection Screen Registration Form on page 62. Make sure to fill out all details including the page the advertisement appeared.

2 Mail the completed Registration Form to PC SuperMarket together with a self-addressed envelope.

3 On receipt of your Registration Form we will issue you a reference number for that purchase. This will be mailed to you. You should keep this on file and be ready to quote it in case of enquiry.

Conditions

1 The order must be placed in direct response to an advertisement in PC SuperMarket only (i.e. not from brochures or other promotional material sent in response to an enquiry). The order must be placed not later than the end of the cover month in which the advertisement appeared (for example, before July 31 for this issue).

2 Details of the order must be registered using the PC SuperMarket Buyer's Protection Scheme Registration Form on Page 62 not later than seven days after the order has been placed with the advertiser.

3 The Buyer's Protection Scheme applies only to PC SuperMarket advertisements. Advertisements appearing in other areas of Australian Personal Computer are not covered.



PC SuperMarket

The PC SuperMarket Buyer's Advisory Service offers an independent guide to selecting PC hardware and software. Based on your needs, and drawing on a database of all available PC products, you will receive personalised written advice on what sort of hardware and software to buy. This will be sent within 48 hours of receipt of this questionnaire. The service costs \$25, and some advertisers may deduct that from the price of their goods.

Please indicate the tasks you need or would like to use your computer for.

Word processing YES NO
Use your computer to create letters and other documents. A word processor can also function as a simple database.

Financial calculation YES NO
The spreadsheet is a powerful tool in answering 'what if' questions. Spreadsheets can also help budget and plan finances.

Record keeping YES NO
Databases help keep track of information. Their power lies in their indexing capabilities.

Book keeping YES NO
Computerised accounts clear the paper mountain and make light work of small business management.

Entertainment YES NO
Games, games, games for the whole family.

Education YES NO
Educational software can complement school and is more exciting than textbooks.

Programming YES NO
Learning to program is challenging and can be rewarding.

Graphics YES NO
Become an electronic artist. The computer can produce marvellous effects, but you'll probably want a printer.

Computer aided design YES NO
The computer can be a valuable aid in drawing plans, designing products and creating line drawings.

Music YES NO
The computer can control a range of instruments, as well as automating manual composing.

Desktop publishing and presentation YES NO
The next step beyond word processing, where text meets pictures. DTP can also be used for business graphics.

Communications YES NO
With a modem, your computer can communicate to other computers, and download programs.

Have you ever used or owned a computer before? YES NO

If yes, please describe your experience

.....
.....

Do you want to run several tasks at once? YES NO
Normally you would load programs as you need them.

What is the maximum you can afford to spend? \$

Do you want that amount to include software? YES NO

Do you want that amount to include peripherals? YES NO

Would you prefer a 'name' brand? YES NO

Would you prefer an Australian-made computer? YES NO

Is portability an important factor? YES NO

Will this computer be part of a network? YES NO

If not, will you share information with other users? YES NO

Any other information you would like considered.

.....
.....

.....
.....

Mr/Mrs/Ms

Address

.....

Suburb State .. Postcode

I agree that your advice is given without legal liability for any consequences arising therefrom.

(signature)

Send your completed form to *PC SuperMarket* Buyer's Advisory Service, PO Box 4088, Sydney 2001 with a cheque for \$25 made payable to Point Partners.

AUSTRALIAN PERSONAL COMPUTER MARKETPLACE

HARDWARE, SOFTWARE & CONSUMABLES GUIDE

COMPANIES INSIDE

Advanced Multimedia	Links & Links
Agate Technology	LN Computers
Auschina Polaris	Logic Dimensions
Austone	MCM
Comdex	MCT
Command Communications	M&G Computers
Computer Services Co.	Maxcom
Computertime	Megagames
Craven Images	Memory Cards
Cyberam	Modemfax
Cybernet	Nasa Technologies
Daitronics	Pegasus
David Kenny Software	Pelham
Doctor Disk	Pink Link
G&A Computer	Pinnacle Tech.
Gate Computer	Polygon Systems
Grand Computer	Protege Solutions
Grantronics	QPlus
Hantron Data	Quench Computers
Invotek	Questa Computers
Knockout Discount Software	REB Distributors
Koorong Books	Rod Irving
Lasertech	SB Computers
Lazarus Ribbons	Superam
Le Computer	

Marketplace is Australian Personal Computer's classified guide to products and services in the computer industry. Products and services covered in Marketplace include networking products, PCs, Windows software packages, multimedia, modems, printer accessories, computer components, slide services, shareware, CD-ROMs, and much more.

Please note:

Marketplace is not part of PC Super Market.



Classified advertising works.

Call Christian Stebbing on (02) 282 8908 for information on our successful classified section in *Australian Personal Computer*.

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486DX-33 VLB \$2580
486DX2-50 VLB \$2695
486DX2-66 VLB \$2785
Pentium-60 VLB \$3995

NOTEBOOKS

IBM 486SX-33 MHz 1936H HSD
In built FAX / MODEM, DOS & Win 1934S
Laser Unit, 486SX-33 MHz, 8MB HSD DOS
V6.0, Win 3.11, MS Works, Crome \$1995
ALL SYSTEMS INCLUDE:
4MB RAM, 340 MB HSD, 1.44 MB FDD,
1.44" Screen, 1" Monitor & Control Logic
1 MB Cache, 121 K / B, Mouse & 3 Year
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Epson Stylus 800 Inkjet Printer \$585
NEW HP Deskjet 300 & 500C SCALL
Sharp Laser 5500 Printer (HP) \$1040
NEC Laser 5500 with free DP \$1045
HP 444 Laserjet Printer \$1875

PERIPHERALS

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340MB IDE HDD \$640
ACER 17" N/A Monitor \$1049
Berlinc 14.4 Fax / Modem \$485
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Novell 3.12 (20 user) \$4850
LanTastic V6.0 Win / Dos \$125
Combo NIC (BNC / UTP) \$85
Compaq BNC Card \$99
Casper Combo Card \$115
Pocket Ethernet (BNC/UTP) \$269

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486DX 33 \$1990
486DX2-66 \$2195
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V6.0 / Win V2.11

Conner 250 Meg KII \$355
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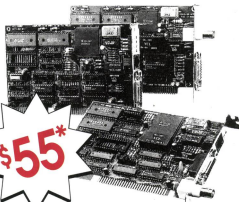
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Coming up in next month's APC

THE THIRD WAVE

Cybersurfing and the Info appliance

First there were character-based programs running on standalone PCs. Then graphical productivity applications running over networks. Now, prepare for The Third Wave — where all computing becomes collaborative and your PC is an interactive client to the richness of the information age.

In the August 1994 issue, we examine the potential of the virtual office to redefine our notions of work, the societal and legal impact of cyber-communities, the increasing connections between computers and 'real-world' objects, and the thriving petrich of the future — the Internet.

The Changing Office

In the August edition, we also examine the workgroup tools of 'the changing office'. In this section, we review groupware, email, and team management packages. We follow with an in-depth analysis of online services, general purpose communications packages and modems.



NetComm modems from the horse's mouth, the star party to end them all parties and the mysteries of magnetic media!

CHIP CHAT

CHIP CHAT'S attention turned to monorail modem manufacturers recently after receiving a call from a distressed and incredulous reader. Trying to run **Coo-ee Lite**, he rang the NetComm support line for assistance. After running some tests from his end, and bringing down his own modem in the process, the **NetComm** support man told our befuddled reader that internal modems refuse to send and receive faxes when used with a 'clone' 486.

IT MUST BE the star party to end all parties! You can now plan and orchestrate the collision of astral bodies to suit your own timing. **Virtual Reality Laboratories** has released the Comet Edition of the program **Distant Suns**, which allows users to model the night sky from their exact location and see the collision of the Shomaker-Levy comet with the planet Jupiter.

But a real excuse for a party must be the actual collision, which is projected to take place in a couple of months, a bang which will

If you want to be in on the action, phone (07) 841 1055 for more information.

IN ANOTHER MEDIUM ENTIRELY, we've all heard of those bargain-basement floppy disks being sold as 'multimedia disks' (which ones aren't, we asked), but now comes the news of shareware specialist **Budgetware**, sending its CD product out in Postpaks marked 'Magnetic media' — avoid X-rays, electric/magnetic fields, do not bend'. Magnetic media? CDs? How 'bout that!

DoubleSpace monorail has twice as many carriages, but is more likely to crash; and the Chicago monorail is due to arrive in five minutes... make that eight minutes... ooops, 10 minutes... well, it will arrive when it's ready, but we can show you a photo of it...

- "Better yet... What about the OS/2 monorail — the ugly one they cannot stop even when they need to, which has a tendency to preempt the track, derailing it at most corners?"

- Or the Unix one — "the fastest one there is, if only someone can work out how to open the doors and start the damned thing."

- CompuServe also joined May's 'monorail madness'. "The CompuServe monorail will cost you \$2.50 to get onboard, and a further \$2.50 for every station you pass. Oh, you want to get OFF here, sir? That'll be another \$2.50..."

- The Microsoft and Intel military-industrial complex has already got the situation covered: "Just when you get your monorail working, after cleaning it up and replacing the Windows which are constantly self-destructing, you will need to buy a new one because your current one will be under-powered to carry the ever increasing loads of fat, seat-hogging passengers. ▲"

IF YOU HAD CREATED VIRTUAL REALITY FIRST... DO YOU THINK YOU MIGHT HAVE SKIPPED REALITY?



Well, Chip Chat thought the term 'clone' had been outmoded years ago. Our freelance engineer Ben Gerhelt tells us that his workplace runs Intel Satisfaction cards with AST 'clones' with no problems at all. Is NetComm trying to tell us its cards don't work with 486s? Surely not.

equal the cataclysm that is thought to have put paid to the dinosaurs. While the collision will not be directly visible from the earth, since it will occur on the other side of the planet, the effects are projected to be visible in a week long galactic spectacular.

AFTER THE PUBLICATION last month of the Lotus SmartSuite monorail, Chip Chat was inundated with news of other vendors leaping to join Lotus on this new and hitherto unexplored platform. Here's a selection:

- "Has anyone seen Lotus' newest platform for SmartSuite?" Wrote one anonymous emailer. "It is now plastered all over one of the monorail trains, with each carriage a different application. Initial interviews with drivers suggest that there are a few bumps, but the Windows have not yet shattered."

- "Lotus could have started something, you know — but what if Microsoft sponsored one?" wrote another. "The timetable'd be a bother — the Word 6.0 monorail departs, and then a minute later the 6.0a one arrives; the



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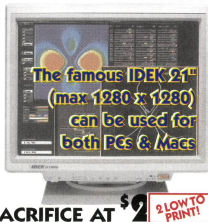
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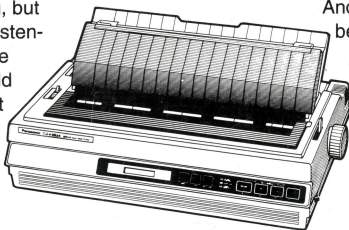


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